CATALOG No. 14

TAPS AND DIES

CARBON & HIGH SPEED STEEL

THISTLE BRAND

TRADE MARK

Winter Bros. Company
·WRENTHAM·MASS·U·S·A·

CATALOG No. 14 AUGUST, 1920

WINTER BROTHERS COMPANY

Carbon Steel, High-Speed Steel

Taps and Dies

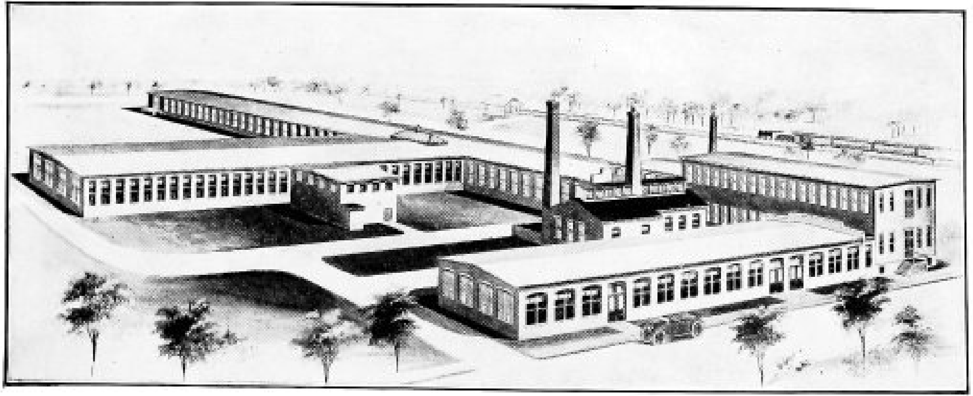
Screw Plates

THISTLE BRAND

This Catalog Cancels all
Previous Editions

12347

Wrentham, Massachusetts
U. S. A.



WINTER BROTHERS COMPANY'S FACTORY
Wrentham, Mass., U. S. A.

Catalog No. 14

(High-Speed Steel Tap and Die Lists in Colored Section)

ALL goods listed in this catalog are fully warranted, and we will replace any tool showing imperfections either in material or workmanship.

When specifications differ in any way from our lists, the goods referred to will be classed as special, and will be charged for at special prices, the prices depending upon the quantity ordered at one time.

When ordering or making inquiry for special goods, give complete specifications, submitting a sketch or a sample when possible.

When ordering either taps or dies to fit a sample, always send a male gauge if possible.

When shipping instructions are not given, we will ship in accordance with our judgment, which must be accepted by the customer.

Goods sent by mail at the purchaser's risk.

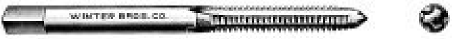
All orders filled with United States Standard threads, unless we are otherwise instructed.

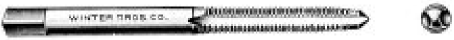
Please read carefully all notes and instructions.

British Ass'n. Taps
Serial Taps
Pulley Taps
Nut Taps
Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
ipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die
ection
Die Stocks
Screw Plate Section

Plug Hand Taps

Two and Three Flute





We do not advise the use of taps as illustrated herewith for hand tapping, though they will often be found to be very well adapted for use in steel. We state with assurance, however, that there are various classes of machine tapping in which these styles will eliminate considerable trouble and expense.

Screw machine operators tapping steel will find that the two flute taps have the necessary cutting qualities and are much stronger than ordinary taps.

We furnish these taps at regular prices in a limited number of sizes and threads as per list below, and machine screw tap list on page 15. Other sizes and threads made to order.

All Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap Inches	Price Each		Number of Threads to the Inch		
	Two Flute	Three Flute	U. S. Standard	S. A. E. Standard	U. S. Form also Furnished
*1/16"	**$0.50**	**$0 .50**	64		72
*1/8"	**.35**	**.35**	40		32
3/16"	**.40**	**.40**	24		32
7/32"	**.45**	**.45**	24		32
Discount Changes Here					
1/4"	**.45**	**.45**	20	28	24
5/16"	**.50**	**.50**	18	24	20
3/8"		**.55**	16	24	20
7/16"		**.60**	14	20	24
1/2"		**.70**	13	20	12, 24

Taper and bottoming taps are special and subject to special prices.

*Exceptions—1/16" and 1/8" in three flute are regular and will be furnished in taper, plug or bottoming style at regular prices.

Machinists' Hand Taps

Under $\frac{1}{4}$″ diameter

WINTER BROS. CO.
WINTER BROS. CO.
WINTER BROS. CO.

All orders will be filled with United States Form of threads unless otherwise specified.

All sizes, lengths and threads not listed are special, and subject to special prices.

Taps with Left-Hand threads are special.

SIZES AND PRICES

Diameter of Tap Inches	Price		Number of Threads to the Inch		
			Standard Pitches		U. S. Form Threads also Furnished
	Each	Per Set	U. S.	Whitworth	
$\frac{1}{16}$	**$0.50**	**$1.50**	64	60	72
$\frac{5}{64}$	**.45**	**1.35**	60		72
$\frac{3}{32}$	**.40**	**1.20**	50	48	48
$\frac{7}{64}$	**.40**	**1.20**	48		
$\frac{1}{8}$	**.35**	**1.05**	40	40	32
$\frac{9}{64}$	**.35**	**1.05**	40		
$\frac{5}{32}$	**.35**	**1.05**	36	32	32
$\frac{11}{64}$	**.35**	**1.05**	32		
$\frac{3}{16}$	**.40**	**1.20**	24	24	32
$\frac{13}{64}$	**.40**	**1.20**	24		
$\frac{7}{32}$	**.45**	**1.35**	24	24	32
$\frac{15}{64}$	**.45**	**1.35**	24		

(Continued on next page.)

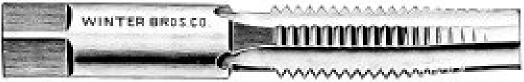
See other styles of flutes for small sizes, on opposite page.

British Ass'n. Taps
Serial Taps
Pulley Taps
Nut Taps
Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
ipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die iection
Die Stocks
Screw Plate Section

Machinists' Hand Taps

Sizes of Shanks Furnished Regularly in ¾" and larger

Full Size Shanks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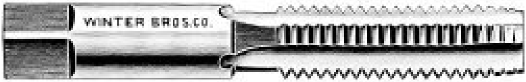
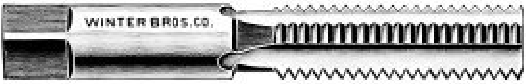
Taper


WINTER BROS.CO.

Plug

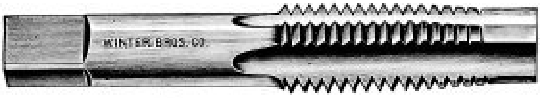

WINTER BROS.CO.

Bottoming

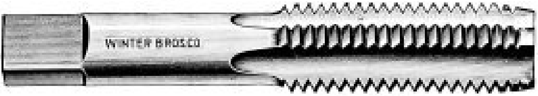
The above style with shanks the full diameter of thread will be furnished in all sizes up to and including ¾".

Exception—¾" will be furnished with shanks the diameter of bottom of thread when orders so specify, at regular prices.

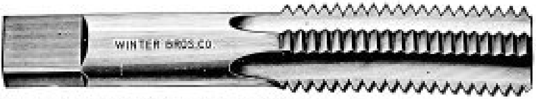
Shanks, the Diameter of Bottom of Thread


WINTER BROS.CO.

Taper


WINTER BROS.CO.

Plug


WINTER BROS.CO.

Bottoming

This style with shanks the diameter of bottom of thread will be furnished in all sizes, $\frac{7}{8}$" and larger.

¾" will also be furnished in this style, when specified, at regular prices.

U. S. Standard form of thread furnished unless otherwise specified.

Left-Hand Taps are special.

See page 115 for table showing the approximate sizes, in decimals, of shanks and squares.

Machinists' Hand Taps

¼" to 1"

SIZES AND PRICES

Diameter of Tap Inches	Price		Number of Threads to the Inch					Length Over-all Inches
			Standard Pitches				U. S. Form Threads also Furnished	
	Each	Per Set	U. S. Std.	S.A.E. Std.	Whitworth Std.	British Std. Fine		
Discount Changes Here								
¼	**$0.45**	**$1.35**	20	28	20	26	24, 27, 32	2½
5/16	**.50**	**1.50**	18	24	18	22	20, 27, 32	2 23/32
⅜	**.55**	**1.65**	16	24	16	20	20, 27	2 15/16
Discount Changes Here								
7/16	**.60**	**1.80**	14	20	14	18	24, 27	3 5/32
½	**.70**	**2.10**	13	20	12	16	12, 24, 27	3⅜
9/16	**.80**	**2.40**	12	18	12	16	27	3 19/32
⅝	**.90**	**2.70**	11	18	11	14	12, 27	3 13/16
11/16	**1.05**	**3.15**	11	16	11	14		4 1/32
¾	**1.20**	**3.60**	10	16	10	12	12, 27	4¼
13/16	**1.40**	**4.20**	10		10	12		4 15/32
⅞	**1.60**	**4.80**	9	14, 18	9	11	12, 27	4 11/16
15/16	**1.80**	**5.40**	9		9			4 29/32
1	**2.00**	**6.00**	8	14	8	10	12, 27	5⅛

(Continued on next page.)

Orders will be filled with United States Standard form of threads unless otherwise specified.

Left-Hand Taps are special.

See page 6 for diameter of shanks furnished regularly.

The approximate diameters of shanks and sizes of squares, in decimals, are shown on page 115.

British Ass'n. Taps
Serial Taps
Pulley Taps
Nut Taps
Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Machinists' Hand Taps

1⅛" to 2½"

SIZES AND PRICES

Diameter of Tap Inches	Price		Number of Threads to the Inch				Length Over-all Inches
			Standard Pitches				
	Each	Per Set	U. S. Std.	S. A. E. Std.	Whitworth Std.	British Standard Fine	
			Discount Changes Here				
1⅛	**$2.25**	**$6.75**	7	12	7	9	5 7/16
1¼	**2.60**	**7.80**	7	12	7	9	5¾
1⅜	**3.00**	**9.00**	6	12	6	8	6 1/16
1½	**3.50**	**10.50**	6	12	6	8	6⅜
1⅝	**4.20**	**12.60**	5½		5		6 11/16
1¾	**5.00**	**15.00**	5		5		7
1⅞	**5.80**	**17.40**	5		4½		7 5/16
2	**6.70**	**20.10**	4½		4½		7⅝
			Discount Changes Here				
2⅛	**8.00**	**24.00**	4½		4½		8
2¼	**9.20**	**27.60**	4½		4		8¼
2⅜	**10.50**	**31.50**	4		4		8½
2½	**11.50**	**34.50**	4		4		8¾

(Concluded)

Orders will be filled with United States Standard threads unless otherwise specified.

Left-Hand Taps are special.

See page 6 for diameter of shanks furnished regularly.

The approximate diameters of shanks and sizes of squares, in decimals, are shown on page 115.

British Association Taps

When so ordered, the taps will be furnished in sets of taper, plug and bottoming, like hand tap.

Plug taps furnished unless otherwise specified.

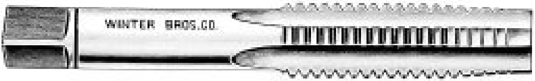
Sizes, lengths and threads not listed are subject to special prices.

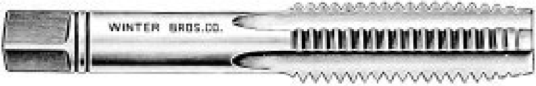
Left-hand taps are special.

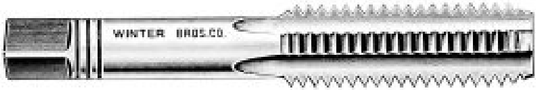
SIZES AND PRICES

No.	Price Each	Diam. mm.	Pitch mm.	No.	Price Each	Diameter mm.	Pitch mm.
0	**$0.35**	6.0	1.00	7	**$0.35**	2.5	.48
1	**.35**	5.3	.90	8	**.35**	2.2	.43
2	**.35**	4.7	.81	9	**.40**	1.9	.39
3	**.35**	4.1	.73	10	**.45**	1.7	.35
4	**.35**	3.6	.66	12	**.50**	1.3	.28
5	**.35**	3.2	.59	14	**.60**	1.0	.23
6	**.35**	2.8	.53				

Serial Taps for Hard Service







These taps are regularly furnished in sets of three, in sizes ¼″ to 1½″ diameter.

Their order in operation is indicated by the number of rings around the shanks. The work is distributed so each tap can be easily operated with slight chance of breakage.

United States Standard taps furnished unless otherwise specified.

Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap Inches	Price		Number of Threads to the Inch	
	Each	Per Set	U. S. Standard	Whitworth Standard
¼	$0.45	$1.35	20	20
$\frac{5}{16}$	.50	1.50	18	18
⅜	.55	1.65	16	16
$\frac{7}{16}$	.60	1.80	14	14
½	.70	2.10	13	12
$\frac{9}{16}$	.80	2.40	12	12
⅝	.90	2.70	11	11
$\frac{11}{16}$	1.05	3.15	11	11
¾	1.20	3.60	10	10
$\frac{13}{16}$	1.40	4.20	10	10
⅞	1.60	4.80	9	9
$\frac{15}{16}$	1.80	5.40	9	9
1	2.00	6.00	8	8
Discount Changes Here				
1⅛	2.25	6.75	7	7
1¼	2.60	7.80	7	7
1⅜	3.00	9.00	6	6
1½	3.50	10.50	6	6

These taps are furnished with shanks the full size of thread from ¼″ to ⅜″ inclusive; larger sizes, the shanks are the diameter of the bottom of thread. The lengths of these taps over-all, are the same as hand taps listed on pages 7 and 8.

Pulley Taps

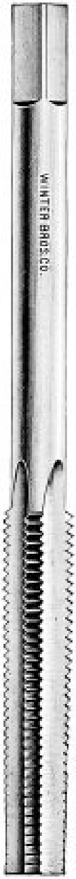
WINTER BROS. CO.

Pulley Taps are furnished in plug style only.
All orders filled with United States Standard threads only.
All sizes and threads not listed are subject to special prices.
Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap Inches	Length Over-all—Price Each					Number of Threads to the Inch
	6″	8″	10″	12″	14″	U. S. Std.
$\frac{1}{4}$	**$0.65**	**$0.70**				20
$\frac{5}{16}$	**.70**	**.75**				18
$\frac{3}{8}$	**.80**	**.85**	**$0.90**	**$0.95**	**$1.00**	16
$\frac{7}{16}$	**.85**	**.95**	**1.00**	**1.05**	**1.15**	14
$\frac{1}{2}$	**.95**	**1.05**	**1.10**	**1.15**	**1.25**	13
$\frac{9}{16}$	**1.00**	**1.15**	**1.25**	**1.35**	**1.45**	12
$\frac{5}{8}$	**1.10**	**1.35**	**1.40**	**1.50**	**1.65**	11
$\frac{3}{4}$			**1.85**	**1.95**	**2 00**	10

Serial Taps
Pulley Taps
Nut Taps
Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
ipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die ection
Die Stocks
Screw Plate Section



Nut Taps

All orders will be filled with U. S. Standard threads unless otherwise specified.

Nut Taps with threads conforming to the standard adopted by the automobile manufacturers, formerly called A. L. A. M., now S. A. E. Standard, and having U. S. Form threads, are included in this list.

All sizes, lengths and threads not listed are special, and subject to special prices.

All Nut Taps with Left-Hand threads are special.

List prices on next page.

Nut Taps

$\frac{3}{16}$″ to 2½″

SIZES AND PRICES

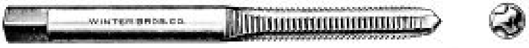
Diameter of Tap Inches	Price Each	Number of Threads to the Inch			Length Over-all Inches
		U. S. Standard	S. A. E. Standard	Whitworth Standard	
$\frac{3}{16}$	$0.60	24, 32	. . .	24	4½
¼	.60	20	28	20	5
$\frac{5}{16}$	.70	18	24	18	5½
⅜	.80	16	24	16	6
$\frac{7}{16}$	.90	14	20	14	6½
½	1.00	13	20	12	7
$\frac{9}{16}$	1.15	12	18	12	7½
⅝	1.35	11	18	11	8
$\frac{11}{16}$	1.60	11	16	11	8½
¾	1.85	10	16	10	9
$\frac{13}{16}$	2.15	10	. . .	10	9½
⅞	2.45	9	14, 18	9	10
$\frac{15}{16}$	2.80	9	. . .	9	10½
1	3.15	8	14	8	11
Discount Changes Here					
1⅛	3.70	7	12	7	11½
1¼	4.50	7	12	7	12
1⅜	5.50	6	12	6	12½
1½	6.75	6	12	6	13
1⅝	8.00	5½	. . .	5	13½
1¾	9.25	5	. . .	5	14
1⅞	10.75	5	. . .	4½	14½
2	12.25	4½	. . .	4½	15
Discount Changes Here					
2⅛	14.00	4½	. . .	4½	15½
2¼	15.75	4½	. . .	4	16
2⅜	17.75	4	. . .	4	16½
2½	20.00	4	. . .	4	17

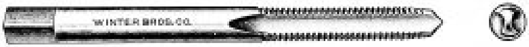
United States Standard threads furnished unless otherwise specified.

Left-hand taps are special.

Sizes, lengths and threads not listed are special, and subject to special prices.

Nut Taps
Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section





Machine Screw Taps

For Machine Use Tapping Steel or Any Metal Requiring Lots of Chip Room

We have always had among our customers numerous large consumers of machine screw taps. We have kept in close touch with these tap users, constantly watching results and endeavoring to increase the production per tap.

After several years of experimental work our experience has led us to carry in stock machine screw taps with three styles of fluting. The regular style, shown on page 15, we believe to be best for hand use and for most cast-iron work. For machine use, tapping steel or other tough metals, the two flute taps shown above will be found to do good work and greatly reduce the breakage loss on small sizes. In sizes above No. 14 some users prefer the three flute style for steel.

Machine screw taps will be furnished regularly, as follows:

TWO FLUTE

In all regularly listed sizes in Plug style only.

THREE FLUTE

Up to and including No. 6 in taper plug or bottoming. No. 7 and larger in plug style only.

FOUR FLUTE

No. 7 and larger in Taper Plug or bottoming.

When not otherwise ordered, machine screw taps up to No. 6 inclusive, will have three flutes, and larger taps four flutes, in Plug style.

We are well prepared to make to order special small taps of all kinds. The prices of these will vary with the quantities ordered.

Do not try to tap full threads with machine screw taps. It does not often happen that over 75% of the total thread depth is required, and frequently considerable less will answer just as well, and save taps and trouble.

See tap drill table, page 116.

Machine Screw Taps

A. S. M. E. Standard

Machine Screw Taps will be furnished in sets of taper, plug and bottoming, when desired, at regular prices.

Plug Taps will be furnished unless otherwise specified.

All sizes and threads not listed will be considered special, and subject to special prices.

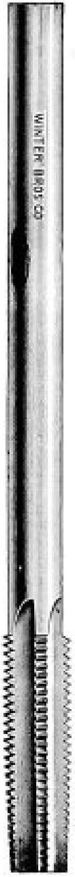
Left-Hand Machine Screw Taps are special.

SIZES AND PRICES

Screw Gauge No.	Price		No. of Threads to the Inch		Length of Thread Inches	Length Over-all Inches
	Each	Per Dozen	Standard	Also Furnished		
0	**$0.50**	**$6.00**	80		3/8	1 5/8
1	**.50**	**6.00**	72	56, 64	7/16	1 11/16
2	**.45**	**5.40**	64	56	1/2	1 3/4
3	**.40**	**4.80**	56	48	9/16	1 13/16
4	**.40**	**4.80**	48	32, 36, 40	5/8	1 7/8
5	**.35**	**4.20**	44	36, 40	11/16	1 15/16
6	**.35**	**4.20**	40	32, 36	3/4	2
7	**.35**	**4.20**	36	30, 32	13/16	2 1/16
8	**.35**	**4.20**	36	30, 32, 40	7/8	2 1/8
9	**.35**	**4.20**	32	24, 30	15/16	2 1/4
10	**.40**	**4.80**	30	24, 28, 32	15/16	2 3/8
12	**.45**	**5.40**	28	24, 32	1	2 3/8
Discount Changes Here						
14	**.45**	**5.40**	24	20	1	2 1/2
16	**.45**	**5.40**	22	18, 20	1 1/16	2 1/2
18	**.50**	**6.00**	20	18	1 1/16	2 23/32
20	**.50**	**6.00**	20	16, 18	1 1/8	2 23/32

See pages 110 and 111 for detailed information on screws of A. S. M. E. standard.

Machine Screw Taps
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section



Tapper Taps

Unless otherwise specified all orders will be filled with U. S. Standard thread taps, eleven inches long, with plain round shanks.

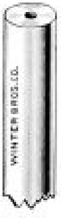
All sizes, lengths and threads not listed are special, and subject to special prices.

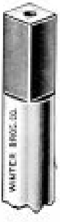
Tapper Taps with Left-Hand threads are special.

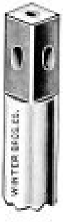
Tapper Taps with threads conforming to the standard adopted by the automobile manufacturers, formerly called A. L. A. M., now S. A. E. Standard, are included in this list.

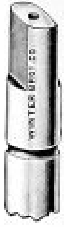
Taps to fit most of the well-known tapper sockets, and taps with square heads, are furnished at regular prices.

List prices are on opposite page.









Tapper Taps

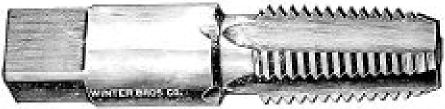
¼″ to 2″

SIZES AND PRICES

Diameter of Tap Inches	Length Over-all—Price Each				Number of Threads to the Inch		
	11″	12″	14″	15″	U. S. Std.	S. A. E. Std.	Whitworth Std.
¼	$0.70	$0.75	$0.80		20	28	20
5/16	.80	.85	.90		18	24	18
⅜	.90	.95	1.00	$1.10	16	24	16
7/16	1.00	1.05	1.15	1.25	14	20	14
½	1.10	1.15	1.25	1.35	13	20	12
9/16	1.30	1.35	1.45	1.55	12	18	12
⅝	1.45	1.50	1.65	1.75	11	18	11
11/16		1.70	1.80	1.95	11	16	11
¾		1.95	2.00	2.10	10	16	10
13/16		2.20	2.25	2.35	10		10
⅞		2.50	2.60	2.75	9	14, 18	9
15/16		2.90	3.00	3.15	9		9
1		3.30	3.50	3.65	8	14	8
Discount Changes Here							
1⅛			4.00	4.15	7	12	7
1¼			4.90	5.10	7	12	7
1⅜			5.75	6.00	6	12	6
1½			7.05	7.35	6	12	6
1⅝			8.00	8.35	5½		5
1¾			9.25	9.65	5		5
1⅞			10.15	10.75	5		4½
2			11.50	12.25	4½		4½

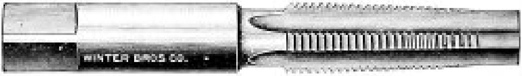
Tapper Taps
Patch Bolt
Boiler Taps
Beaman & Smith
Stove Bolt
Chasers
Stay-Bolt Taps
Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Patch Bolt Taps

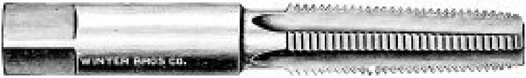

WINTER BROS CO.

These taps taper ¾″ to the foot.
The diameter is measured ⅝″ from large end of thread.
Will be furnished in U. S. S. or V form of thread as specified.
U. S. S. form of thread furnished unless otherwise specified.
Left-Hand Taps are special.
Sizes, lengths and threads not listed are subject to special prices.

Straight and Taper Boiler Taps


WINTER BROS CO.

Straight


WINTER BROS CO.

Taper

These taps taper ¾″ to the foot.
The diameter is measured ⅝″ from large end of thread.
Will be furnished in U. S. S. or V form of thread as desired.
U. S. S. Form of thread furnished unless otherwise specified.
Left-Hand Taps are special.
Sizes, lengths and threads not listed are subject to special prices

Patch Bolt Taps

All Patch Bolt Taps have 12 threads to the inch.

SIZES AND PRICES

Diameter of Tap Inches	Price Each	Length Over-all Inches	Diameter of Tap Inches	Price Each	Length Over-all Inches
½	**$1.00**	3	15/16	**$2.40**	3¼
9/16	**1.10**	3	1	**2.80**	3½
⅝	**1.25**	3	**Discount Changes Here**		
11/16	**1.45**	3	1 1/16	**2.90**	3½
¾	**1.70**	3¼	1⅛	**3.00**	3½
13/16	**1.95**	3¼	1 3/16	**3.15**	3½
⅞	**2.25**	3¼	1¼	**3.35**	3½

Straight and Taper Boiler Taps

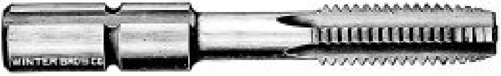
All Straight and Taper Boiler Taps have 12 threads to the inch.

SIZES AND PRICES

Diameter of Tap Inches	Price Each	Length Over-all Inches	Diameter of Tap Inches	Price Each	Length Over-all Inches
½	**$1.05**	4¼	1 3/16	**$3.85**	7
9/16	**1.25**	4⅝	1¼	**4.05**	7⅛
⅝	**1.40**	5	1 5/16	**4.35**	7¼
11/16	**1.60**	5¼	1⅜	**4.70**	7⅜
¾	**1.95**	5½	1 7/16	**5.30**	7½
13/16	**2.25**	5¾	1½	**5.50**	7⅝
⅞	**2.50**	6	1⅝	**5.80**	7¾
15/16	**2.80**	6¼	1¾	**6.10**	7⅞
1	**3.35**	6½	1⅞	**6.40**	8
Discount Changes Here			2	**6.70**	8
1 1/16	**3.50**	6¾			
1⅛	**3.65**	6⅞			

Patch Bolt Boiler Taps
Beaman & Smith Stove Bolt Chasers
Stay-Bolt Taps
Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Taps for Beaman and Smith Holders



All orders filled with United States Standard threads unless otherwise specified.

Beaman and Smith Taps are furnished regularly in plug style only.

Left-Hand Taps are special.

SIZES AND PRICES

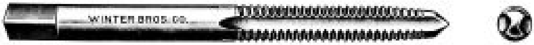
Diameter of Tap Inches	Price Each		No. of Threads to Inch		Diameter of Shank Inches	Length Over-all Inches
	Fitting No. 1 Holder	Fitting No. 2 Holder	U. S. Standard	S. A. E. Standard		
¼	**$0.55**		20	28	½	2¼
5/16	**.55**		18	24	½	3
⅜	**.55**		16	24	½	3¼
7/16	**.75**		14	20	½	3½
½	**.75**		13	20	½	3¾
9/16	**.80**		12	18	½	4
⅝	**.90**		11	18	½	4
⅝		**$1.20**	11	18	¾	3 13/16
11/16		**1.20**	11	16	¾	4⅛
¾		**1.20**	10	16	¾	4 1/16
13/16		**1.50**	10		¾	4¾
⅞		**1.60**	9	14, 18	¾	5 1/16
15/16		**1.80**	9		¾	5⅜
1"		**2.20**	8	14	¾	5 11/16
1⅛		**2.40**	7	12	¾	6
1¼		**2.60**	7	12	¾	6

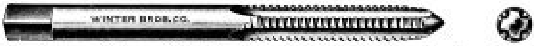
Prices on taps fitting No. 2½ and No. 3 holders given on application.

These taps are also suitable for the Wizard Turret Tap Holder.

In the tapping of tough metal we do not recommend the use of ⅝" taps with No. 1 shanks or 1⅛" and 1¼" taps with No. 2 shanks as there is not sufficient strength to stand the strain.

Stove Bolt Taps





We make our Stove Bolt Taps to correspond to the American Screw Co.'s Stove Bolts. Stove Bolt Taps furnished in plug style only.

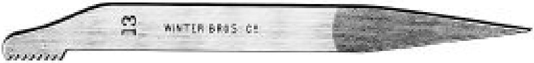
All sizes and threads not listed are special, and subject to special prices. Two fluted Stove Bolt Taps furnished at regular prices in $\frac{3}{16}$", ¼" and $\frac{5}{16}$" sizes only.

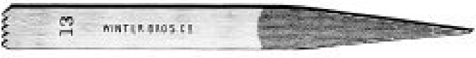
Left-Hand Taps are Special

SIZES AND PRICES

Diameter of Tap Inches	Price		Number of Threads to the Inch
	Each	Per Dozen	
$\frac{3}{16}$	**$0.40**	**$4.80**	24
	Discount Changes Here		
¼	**.45**	**5.40**	18
$\frac{5}{16}$	**.50**	**6.00**	18
⅜	**.55**	**6.60**	16

Hand Screw Chasers

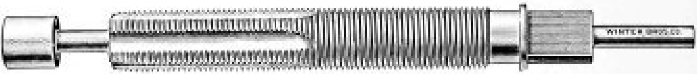




V Form of thread furnished unless otherwise specified.
All threads not listed are special, and subject to special prices.

Number of Threads per Inch	Price	
	Each	Per Pair
V and U. S. Form		
4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16	**$0.40**	**$0.80**
18, 19, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40	**.35**	**.70**
Whitworth Standard; British Standard Fine, and British Pipe Standard		
5, 6, 7, 8, 9, 10, 11, 12, 14, 16	**.40**	**.80**
18, 19, 20, 22, 24, 26, 28, 32, 40	**.35**	**.70**

Spindle Stay-Bolt Taps



For re-tapping stay-bolt holes from the inside of locomotive fire boxes. United States Standard form of thread furnished unless otherwise specified.

V Standard thread furnished at regular prices.

Taps shorter than 8″ will be charged as if 8″ long, and fractions of an inch will be charged as a full extra inch.

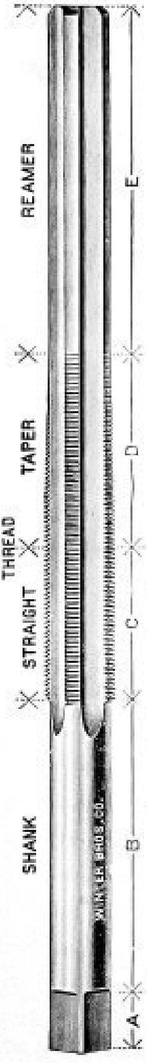
Spindle stay-bolt taps of the following measurements are carried in stock.

Length over-all	7⅝″
Length of fluted thread	3¼″
Length of unfluted thread	2¼″
Diameter of spindle	⅜″
Length of spindle	11″

All taps have 12 threads per inch.

SIZES AND PRICES

Diameter of Tap Inches	Price		Diameter of Tap Inches	Price	
	For a Tap 7⅝″ Long	Per Inch for Other Lengths		For a Tap 7⅝″ Long	Per Inch for Other Lengths
¾	**$8.00**	**$1.00**	1 3/16	**$10.80**	**$1.35**
13/16	**8.40**	**1.05**	1¼	**11.20**	**1.40**
⅞	**8.80**	**1.10**	1 5/16	**11.60**	**1.45**
15/16	**9.20**	**1.15**	1⅜	**12.00**	**1.50**
1	**9.60**	**1.20**	1 7/16	**12.40**	**1.55**
1 1/16	**10.00**	**1.25**	1½	**12.80**	**1.60**
1⅛	**10.40**	**1.30**			



Stay-Bolt Taps

In ordering stay-bolt taps, state diameter and number of threads to the inch; also length and dimensions of parts as indicated in the cut by letters A, B, C, D, E.

All stay-bolt taps will be furnished with 12 U.S.S. threads to the inch, unless otherwise specified.

Stay-bolt taps with 12 threads to the inch, V and Whitworth Standard forms, furnished at regular list and discount.

The diameter given is that of the thread at its straight part.

Prices are for each inch of length, 16 inches and upwards.

Fractions of an inch will be charged as a full extra inch.

Taps shorter than 16 inches will be charged as if 16 inches long.

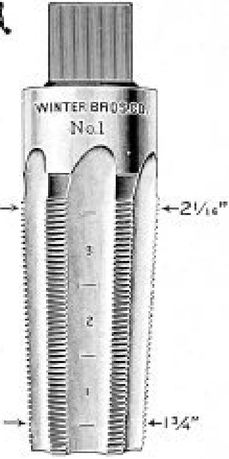
Blank order slips will be furnished on application.

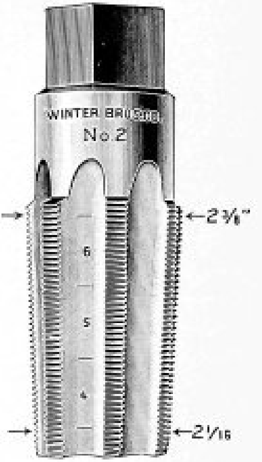
Stay-bolt taps 20 inches and 24 inches long in sizes $\frac{3}{4}''$ to $1\frac{1}{2}''$ diameter having the following proportions are considered regular and carried in stock. The discount on those of other dimensions depends on the quantity ordered.

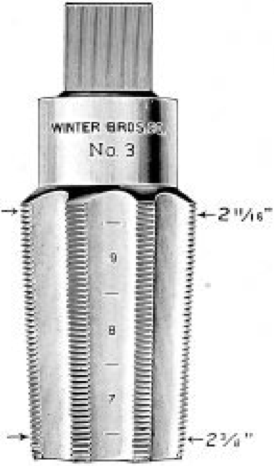
	A	B	C	D	E
20	1	6	$1\frac{1}{2}$	6	$5\frac{1}{2}$
24	1	8	2	6	7

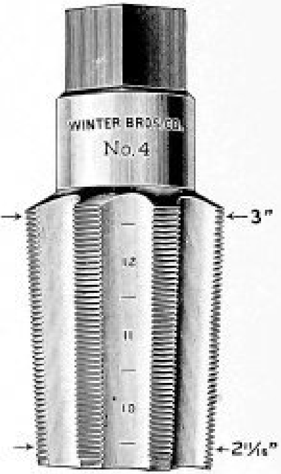
Diameter of Tap, Inches	Price per Inch	Diameter of Tap, Inches	Price per Inch
$\frac{3}{4}$	$0.40	$1\frac{3}{16}$	$0.55
$\frac{13}{16}$	.40	$1\frac{1}{4}$	.55
$\frac{7}{8}$	.40	$1\frac{5}{16}$	.60
$\frac{15}{16}$	.45	$1\frac{3}{8}$	.60
1	.45	$1\frac{7}{16}$	.70
$1\frac{1}{16}$	.50	$1\frac{1}{2}$	.70
$1\frac{1}{8}$	.50		

Mud Plug Taps









Mud Plug Taps

Used for tapping washout holes in locomotives.

These taps taper 1¼" per foot, and the complete set of four taps covers a range in cutting size from 1¾" to 3". They are marked to correspond with taper plugs bearing the same numbers as the twelve diameters shown on the four taps.

Each tap is 6½" long, and all have the same size shank and square. All taps have 12 threads to the inch, and can be furnished in either V or United States Standard form of thread. United States Standard thread furnished unless otherwise specified.

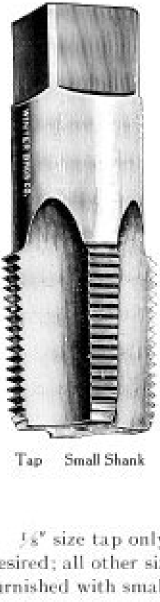
Sizes, lengths and threads not listed are special and subject to special prices.

Left-Hand Taps are special.

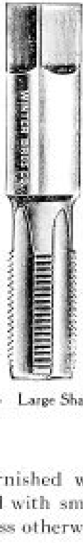
No.	Inches	Price Each
1	1¾ to 2 1/16	**$7.60**
2	2 1/16 to 2⅜	**9.50**
3	2⅜ to 2 11/16	**12.50**
4	2 11/16 to 3	**14.45**

Mud Plug Taps
Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

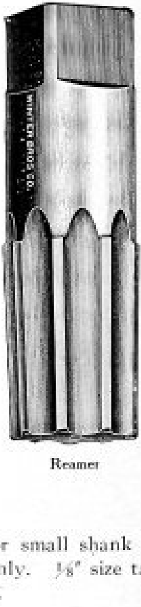
Pipe Taps and Pipe Reamers


WINTER BROS. CO.

Tap Small Shank


WINTER BROS. CO.

Tap Large Shank


WINTER BROS. CO.

Reamer

⅛" size tap only will be furnished with large or small shank as desired; all other sizes furnished with small shank only. ⅛" size tap furnished with small shank unless otherwise specified.

Prices on opposite page.

Pipe Hobs are listed on page 32.

Pipe Taps with inserted chasers are listed on page 28.

Pipe Taps, and Pipe Reamers

Briggs' Standard Right-Hand Pipe Taps will be furnished unless otherwise specified.

Straight (plug) pipe taps will be furnished at regular prices.

Briggs' Standard Left-Hand Pipe Taps take a different discount from Right-Hand.

All other Left-Hand Pipe Taps are special.

Reamers for Briggs' Standard Pipe Taps take the same list prices as the taps.

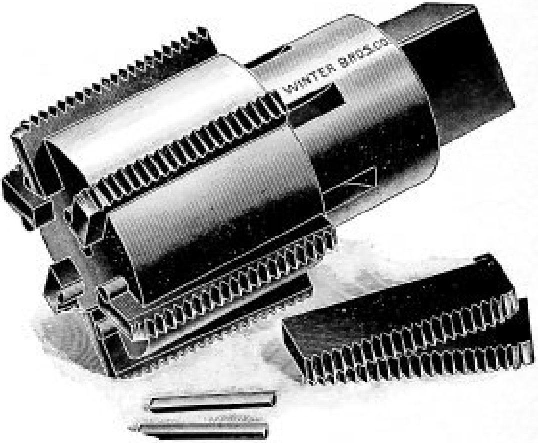
SIZES AND PRICES

Nominal Size Inches	Price Each	Number of Threads to the Inch		Length of Thread Inches	Length Over-all Inches
		Briggs' Standard	Whitworth Standard		
1/8	**$1.00**	27	28	1/4	2 1/8
1/4	**1.20**	18	19	1 1/16	2 7/16
3/8	**1.60**	18	19	1 1/16	2 9/16
1/2	**2.00**	14	14	1 3/8	3 1/8
5/8	**2.80**		14	1 3/8	3 3/16
3/4	**2.80**	14	14	1 3/8	3 1/4
7/8	**4.40**		14	1 9/16	3 1/2
1	**4.40**	11 1/2	11	1 3/4	3 3/4
Discount Changes Here					
1 1/4	**5.00**	11 1/2	11	1 3/4	4
1 1/2	**6.60**	11 1/2	11	1 3/4	4 1/4
1 3/4	**8.00**		11	1 3/4	4 3/8
2	**10.00**	11 1/2	11	1 3/4	4 1/2
Discount Changes Here					
2 1/4	**12.00**		11	2 1/8	5
2 1/2	**15.00**	8	11	2 9/16	5 1/2
*2 3/4	**18.00**		11	2 9/16	5 3/4
3	**22.50**	8	11	2 5/8	6
Discount Changes Here					
3 1/4	**25.50**		11	2 5/8	6 1/4
3 1/2	**30.00**	8	11	2 11/16	6 1/2
3 3/4	**36.00**		11	2 11/16	6 5/8
4	**45.00**	8	11	2 3/4	6 3/4

* All our pipe taps 2¾″ and larger are made in the inserted chaser style only (see page 28). The 2½″ size is made either solid or with inserted chasers.

Pipe Taps and Reamers
Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Pipe Taps with Inserted Chasers



This style of tap has been thoroughly tested and approved by our most particular customers.

High-Speed Steel Taps of this style are especially economical. (See note on page 93.)

These taps are also furnished in Whitworth Standard threads at regular prices.

Size	Prices	
	Tap Complete	Chasers Per Set
2½	**$15.00**	**$6.00**
3	**22.50**	**6.00**
Discount Changes Here		
3½	**30.00**	**6.00**
4	**45.00**	**6.00**

Sizes up to 4″ are carried in stock, and prices on these sizes are subject to discount. The larger sizes are made to order only.

Large taps of all kinds made to order in this style.

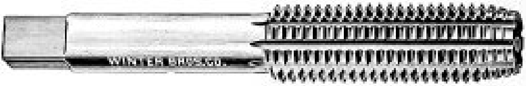
Solid Pipe Taps listed on page 27.

Index for Die Hobs

Page
Short Die Hobs 30
Long Die Hobs 31
Pipe Hobs 32

Die Hobs
Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Short Die Hobs



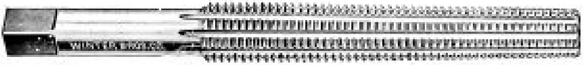
United States Standard threads furnished unless otherwise specified.
All sizes and pitches not listed are subject to special prices.
Left-Hand Hobs are special.

SIZES AND PRICES

Diameter of Hob Inches	Price Each	Number of Threads to the Inch			Length Over-all Inches
		U. S. Standard	S. A. E. Standard	Whitworth Standard	
1/4	$0.65	20	28	20	2 1/2
5/16	.70	18	24	18	2 23/32
3/8	.75	16	24	16	2 15/16
7/16	.85	14	20	14	3 5/32
1/2	1.00	13	20	12	3 3/8
9/16	1.10	12	18	12	3 19/32
5/8	1.25	11	18	11	3 13/16
11/16	1.45	11	16	11	4 1/32
3/4	1.70	10	16	10	4 1/4
13/16	1.95	10		10	4 15/32
7/8	2.25	9	14, 18	9	4 11/16
15/16	2.50	9		9	4 29/32
1	2.80	8	14	8	5 1/8
1 1/8	3.15	7	12	7	5 7/16
1 1/4	3.65	7	12	7	5 3/4
1 3/8	4.20	6	12	6	6 1/16
1 1/2	4.60	6	12	6	6 3/8
1 5/8	5.45	5 1/2		5	6 11/16
1 3/4	5.80	5		5	7
1 7/8	6.15	5		4 1/2	7 5/16
2	6.70	4 1/2		4 1/2	7 5/8

Note:—Short Die Hobs will be furnished exact size unless otherwise specified. Oversize or undersize die hobs will be considered special and subject to special prices.

Long Die Hobs



United States Standard threads furnished unless otherwise specified.
All sizes and pitches not listed are subject to special prices.
Left-Hand Hobs are special.

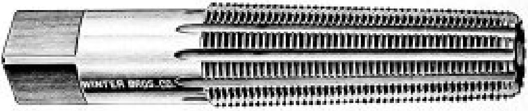
SIZES AND PRICES

Diameter of Hob Inches	Price Each	Number of Threads to the Inch			Length Over-all Inches
		U. S. Standard	S. A. E. Standard	Whitworth Standard	
¼	**$1.25**	20	28	20	3½
5/16	**1.35**	18	24	18	4
⅜	**1.50**	16	24	16	4½
7/16	**1.70**	14	20	14	5
½	**1.90**	13	20	12	5½
9/16	**2.20**	12	18	12	6
⅝	**2.50**	11	18	11	6½
11/16	**2.85**	11	16	11	7
¾	**3.20**	10	16	10	7½
13/16	**3.60**	10		10	8
⅞	**4.00**	9	14, 18	9	8½
15/16	**4.50**	9		9	8¾
1	**5.00**	8	14	8	9
1⅛	**5.75**	7	12	7	9¼
1¼	**6.50**	7	12	7	9½
1⅜	**7.50**	6	12	6	9¾
1½	**8.50**	6	12	6	10
1⅝	**9.75**	5½		5	10¼
1¾	**11.00**	5		5	10½
1⅞	**12.50**	5		4½	10¾
2	**14.00**	4½		4½	11

Note:—Long Die Hobs will be furnished exact size unless otherwise specified. Oversize or undersize die hobs will be considered special and subject to special prices.

Metric Taps
Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Pipe Hobs



Briggs' Standard, Right-Hand pipe hobs are furnished unless otherwise specified.

Sizes, lengths and threads not listed are subject to special prices.

Left-Hand hobs are special.

SIZES AND PRICES

Nominal Size Inches	Price Each	Number of Threads to the Inch	
		Briggs' Standard	Whitworth Standard
⅛	**$1.75**	27	28
¼	**2.00**	18	19
⅜	**2.30**	18	19
½	**2.75**	14	14
⅝	**3.25**		14
¾	**3.25**	14	14
⅞	**4.00**		14
1	**4.00**	11½	11
1¼	**5.00**	11½	11
1½	**6.60**	11½	11
1¾	**8.00**		11
2	**10.00**	11½	11
2¼	**12.00**		11
2½	**12.00**	8	11
2¾	**18.00**		11
3	**22.50**	8	11
3¼	**25.50**		11
3½	**30.00**	8	11
3¾	**36.00**		11
4	**45.00**	8	11

Index for Metric Tap Section

French and International Standards

Pages
Machinists' Hand Taps 34–35–36
Serial (Hard Service) Hand Taps 37
Tapper Taps 38–39
Spindle Stay-Bolt Taps 40
Stay-Bolt Taps 41
Short Die Hobs 42
Long Die Hobs 43
Nut Taps 44

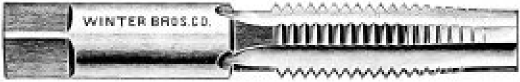
Metric Taps
Tap Wrenches
Die ection
Die Stocks
Screw Plate Section

Machinists' Hand Taps

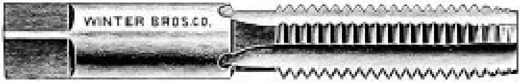
French and International Standard

Sizes of Shanks Furnished Regularly

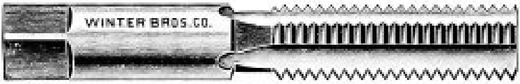
Full Size Shanks


WINTER BROS.CO.

Taper


WINTER BROS.CO.

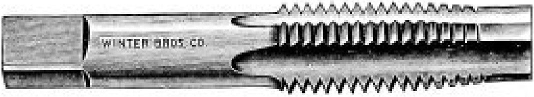
Plug


WINTER BROS.CO.

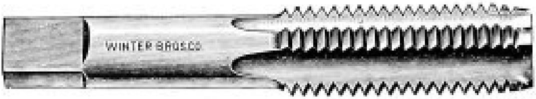
Bottoming

Orders for hand taps to and including 8 m/m will be filled with taps having shanks full diameter of thread. Taps 9 m/m and larger will be furnished with shanks size of bottom of thread.

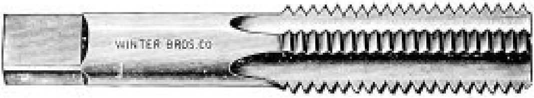
Shanks, the Diameter of Bottom of Thread


WINTER BROS.CO.

Taper


WINTER BROS.CO.

Plug


WINTER BROS.CO.

Bottoming

Hand Taps

French and International Standards

Sizes, lengths and threads not listed are subject to special prices. Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap m/m	Price		Standard Pitches m/m	
	Each	Per Set	French	International
2	**$0.45**	**$1.35**	....	.45
2.5	**.40**	**1.20**	....	.45
3	**.40**	**1.20**	.5	.60
3.5	**.35**	**1.05**	....	.60
4	**.35**	**1.05**	.75	.75
4.5	**.35**	**1.05**	....	.75
5	**.40**	**1.20**	.75	.90
5.5	**.40**	**1.20**	....	.90
6	**.45**	**1.35**	1.0	1.0

(Continued on next page).

International Pitches in sizes 2 m/m to 5.5 m/m inclusive are those adopted by the French Navy, Department of War, Railway Companies, etc., and approved by the society for the advancement of National Industries.

Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Hand Taps

French and International Standards

(Concluded)

SIZES AND PRICES

Diameter of Tap m/m	Price		Standard Pitches m/m		
	Each	Per Set	French	International	Also Furnished
Discount Changes Here					
7	**$0.45**	**$1.35**	1.0	1.0	....
8	**.50**	**1.50**	1.0	1.25	....
9	**.55**	**1.65**	1.0	1.25	....
Discount Changes Here					
10	**.55**	**1.65**	1.5	1.5	....
11	**.60**	**1.80**	....	1.5	....
12	**.70**	**2.10**	1.5	1.75	....
14	**.80**	**2.40**	2.0	2.0	....
16	**.90**	**2.70**	2.0	2.0	....
18	**1.05**	**3.15**	2.5	2.5	1.5
20	**1.40**	**4.20**	2.5	2.5	....
22	**1.60**	**4.80**	2.5	2.5	....
24	**1.80**	**5.40**	3.0	3.0	....
26	**2.00**	**6.00**	3.0	....	....
Discount Changes Here					
27	**2.25**	**6.75**	....	3.0	....
28	**2.25**	**6.75**	3.0	....	....
30	**2.60**	**7.80**	3.5	3.5	....
32	**2.60**	**7.80**	3.5	....	....
33	**3.00**	**9.00**	....	3.5	....
34	**3.00**	**9.00**	3.5	.....	....
36	**3.50**	**10.50**	4.0	4.0	....
38	**3.50**	**10.50**	4.0	....	....
39	**4.20**	**12.60**	....	4.0	....
40	**4.20**	**12.60**	4.0	....	....
42	**4.20**	**12.60**	4.5	4.5	....
44	**5.00**	**15.00**	4.5	....	....
45	**5.00**	**15.00**	....	4.5	....
46	**5.80**	**17.40**	4.5	....	....
48	**5.80**	**17.40**	5.0	5.0	....
50	**6.70**	**20.10**	5.0	....	....

Serial Hand Taps

French and International Standards

Serial Hand Taps are furnished with shanks full size of thread from 6 m/m to 8 m/m inclusive and with shanks size of bottom of thread on 9 m/m and larger.

Sizes, lengths and threads not listed are subject to special prices.

Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap m/m	Price		Standard Pitches m/m	
	Each	Per Set	French	International
6	**$0.45**	**$1.35**	1.0	1.0
7	**.45**	**1.35**	1.0	1.0
8	**.50**	**1.50**	1.0	1.25
9	**.55**	**1.65**	1.0	1.25
10	**.55**	**1.65**	1.5	1.5
11	**.60**	**1.80**	....	1.5
12	**.70**	**2.10**	1.5	1.75
14	**.80**	**2.40**	2.0	2.0
16	**.90**	**2.70**	2.0	2.0
18	**1.05**	**3.15**	2.5	2.5
20	**1.40**	**4.20**	2.5	2.5
22	**1.60**	**4.80**	2.5	2.5
24	**1.80**	**5.40**	3.0	3.0
26	**2.00**	**6.00**	3.0	....
Discount Changes Here				
27	**2.25**	**6.75**	....	3.0
28	**2.25**	**6.75**	3.0	....
30	**2.60**	**7.80**	3.5	3.5
32	**2.60**	**7.80**	3.5	....
33	**3.00**	**9.00**	....	3.5
34	**3.00**	**9.00**	3.5	....
36	**3.50**	**10.50**	4.0	4.0
38	**3.50**	**10.50**	4.0	....

Tap Wrenches

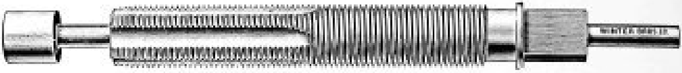
Die ection

Die Stocks

Screw Plate Section

Spindle Stay-Bolt Taps

French and International Standards



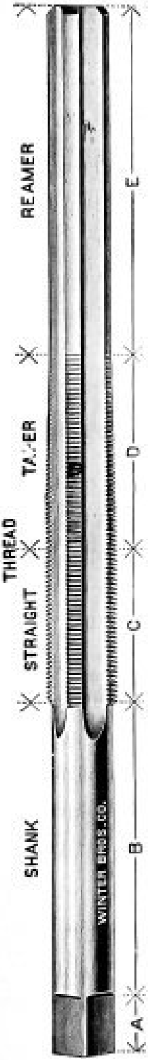
Taps shorter than 8 inches will be charged as if 8 inches long, and fractions of an inch in length will be charged as a full extra inch.

Spindle Stay-Bolt Taps having the following proportions have been found by experience to answer for the average requirements.

Length overall	7⅝"
Length of fluted Thread	3¼"
Length of unfluted Thread	2¼"
Diameter of Spindle	⅜"
Length of Spindle	11"

SIZES AND PRICES

Diameter of Tap m/m	Price		Diameter of Tap m/m	Price	
	For a Tap 7⅝" Long	Per Inch for Other Lengths		For a Tap 7⅝" Long	Per Inch for Other Lengths
20	**$8.40**	**$1.05**	30	**$10.80**	**$1.35**
22	**8.80**	**1.10**	32	**11.20**	**1.40**
24	**9.20**	**1.15**	33	**11.60**	**1.45**
26	**9.60**	**1.20**	34	**12.00**	**1.50**
27	**10.00**	**1.25**	36	**12.40**	**1.55**
28	**10.40**	**1.30**	38	**12.80**	**1.60**



Stay-Bolt Taps

Taps shorter than 16 inches will be charged as if 16 inches long, and fractions of an inch in length will be charged as a full extra inch.

All metric Stay-Bolt Taps are special, and discount depends upon the quantity ordered.

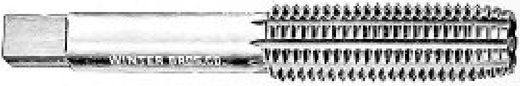
SIZES AND PRICES

Diameter of Tap m/m	Price Per Inch	Diameter of Tap m/m	Price Per Inch
20	**$0.40**	30	**$0.55**
22	**.40**	32	**.55**
24	**.45**	33	**.60**
26	**.45**	34	**.60**
27	**.50**	36	**.70**
28	**.50**	38	**.70**

Tap Wrenches
Die Section
Die Stocks
Screw Plate Section

Short Die Hobs

French and International Standards


WINTER BROS. CO.

Sizes, lengths and threads not listed are subject to special prices. Left-Hand Hobs are special.

SIZES AND PRICES

Diameter of Hob m/m	Price Each	Standard Pitches m/m	
		French	International
6	**$0.65**	1.0	1.0
7	**.65**	1.0	1.0
8	**.70**	1.0	1.25
9	**.75**	1.0	1.25
10	**.75**	1.5	1.5
11	**.85**	. . .	1.5
12	**1.00**	1.5	1.75
14	**1.10**	2.0	2.0
16	**1.25**	2.0	2.0
18	**1.45**	2.5	2.5
20	**1.95**	2.5	2.5
22	**2.25**	2.5	2.5
24	**2.50**	3.0	3.0
26	**2.80**	3.0	. . .
27	**3.15**	. . .	3.0
28	**3.15**	3.0	. . .
30	**3.65**	3.5	3.5
32	**3.65**	3.5	. . .
33	**4.20**	. . .	3.5
34	**4.20**	3.5	. . .
36	**4.60**	4.0	4.0
38	**4.60**	4.0	. . .

Long Die Hobs

French and International Standards

Sizes, lengths and threads not listed are subject to special prices. Left-Hand Hobs are special.

SIZES AND PRICES

Diameter of Hob m/m	Price Each	Standard Pitch m/m	
		French	International
6	**$1.25**	1.0	1.0
7	**1.25**	1.0	1.0
8	**1.35**	1.0	1.25
9	**1.50**	1.0	1.25
10	**1.50**	1.5	1.5
11	**1.70**	...	1.5
12	**1.90**	1.5	1.75
14	**2.20**	2.0	2.0
16	**2.50**	2.0	2.0
18	**2.85**	2.5	2.5
20	**3.60**	2.5	2.5
22	**4.00**	2.5	2.5
24	**4.50**	3.0	3.0
26	**5.00**	3.0	...
27	**5.75**	...	3.0
28	**5.75**	3.0	...
30	**6.50**	3.5	3.5
32	**6.50**	3.5	...
33	**7.50**	...	3.5
34	**7.50**	3.5	...
36	**8.50**	4.0	4.0
38	**8.50**	4.0	...

Tap Wrenches
Die ection
Die Stocks
Screw Plate Section

Nut Taps

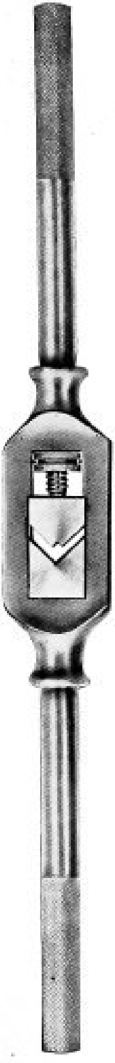
French and International Standards

Sizes, lengths and threads not listed are subject to special prices. Left-Hand Taps are special.

SIZES AND PRICES

Diameter of Tap m/m	Price Each	Standard Pitches m/m	
		French	International
6	**$0.60**	1.0	1.0
7	**.60**	1.0	1.0
8	**.70**	1.0	1.25
9	**.80**	1.0	1.25
10	**.80**	1.5	1.5
11	**.90**	...	1.5
12	**1.00**	1.5	1.75
14	**1.15**	2.0	2.0
16	**1.35**	2.0	2.0
18	**1.60**	2.5	2.5
20	**2.15**	2.5	2.5
22	**2.45**	2.5	2.5
24	**2.80**	3.0	3.0
26	**3.15**	3.0	...
Discount Changes Here			
27	**3.70**	...	3.0
28	**3.70**	3.0	...
30	**4.50**	3.5	3.5
32	**4.50**	3.5	...
33	**5.50**	...	3.5
34	**5.50**	3.5	...
36	**6.75**	4.0	4.0
38	**6.75**	4.0	...
39	**8.00**	...	4.0
40	**8.00**	4.0	...
42	**8.00**	4.5	4.5
44	**9.25**	4.5	...
45	**9.25**	...	4.5
46	**10.75**	4.5	...
48	**10.75**	5.0	5.0
50	**12.25**	5.0	...

Type of No. 2-3-4-5



Tap Wrenches

A strong and convenient tap wrench at a reasonable price.

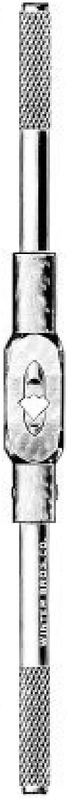
The body is a drop forging.

The adjustment is very simple and satisfactory.

Number	Price Each	Sizes of Tap that Wrench Holds Inches	Length Over-all Inches
1	$1.50	1/16 to 1/4	7
2	3.50	1/4 to 1/2	11
3	4.00	1/4 to 3/4	16
4	5.00	1/4 to 1	21
5	8.00	5/8 to 1 1/2	34

No. 3 holds pipe taps ⅛" to ⅜"
No. 4 holds pipe taps ⅛" to ½"
No. 5 holds pipe taps ½" to 1¼"

Type of No. 1



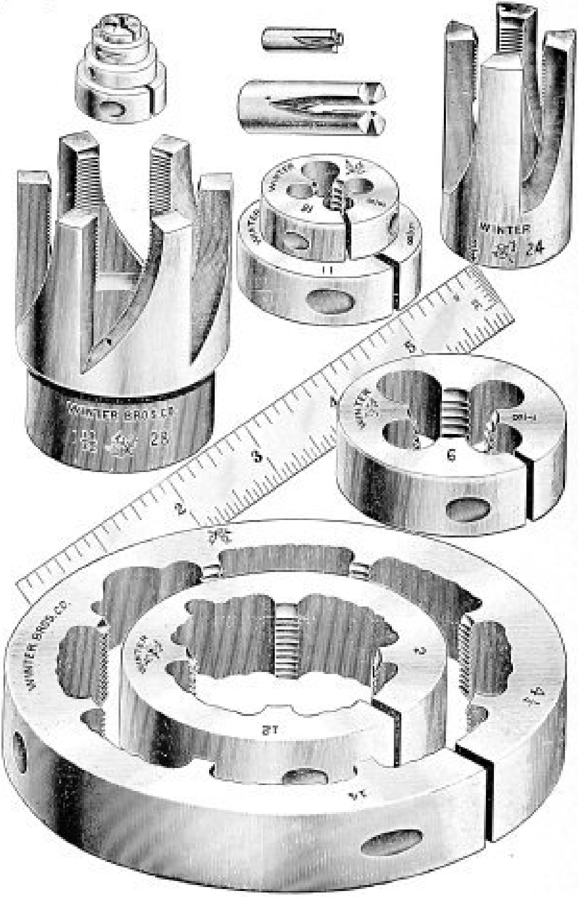
Tap Wrenches

Die ection

Die Stocks

Screw Plate Section

Die Section



Index to Die Section

Adjustable Round Dies.

Outside Diameter		Page
5/8"	Machine Screw Sizes	48
13/16"	Fractional Sizes	49
1"	French and International Standard	56
1 5/16"		
1 1/2"	Fractional Sizes	50
1 9/16"	French and International Standard	56–57
1 3/4"		
2"		
2 1/4"	Fractional Sizes	51
2 1/2"	French and International Standard	57
3"		

Solid Square Bolt Dies 53
Solid Square Pipe Dies 54
British Association Standard 55

Spring Screw Threading Dies

A. S. M. E. Standard 58
U. S. Standard, S. A. E. Standard, Whitworth Standard 59–60
French and International Standard 61–62
Adjustable Round Dies for Pipe 64

Die Section
Die Stocks
Screw Plate Section

Adjustable Round Split Dies

Machine Screw Sizes. A. S. M. E. Standard.

Outside Diameters

5/8″ 13/16″ 1″

With
Adjusting Screw

Without
Adjusting Screw

All sizes and threads not listed are special and subject to special prices.
Dies with Left-Hand threads are special.
Read page 105.

SIZES AND PRICES

Screw Gauge No.	Outside Diameter, Price Each.			No. of Threads to the Inch	
	*5/8″ Diameter 1/4″ Thick	13/16″ Diameter 1/4″ Thick	1″ Diameter 3/8″ Thick	Standard	Threads also Furnished
0	**$0.80**	**$0.90**		80	
1	**.80**	**.90**		72	64, 56
2	**.70**	**.80**		64	56
3	**.60**	**.70**		56	48
4	**.50**	**.60**		48	36, 40, 32
5	**.50**	**.60**		44	36, 40
6	**.50**	**.60**	**$0.75**	40	32, 36
7	**.50**	**.60**	**.75**	36	30, 32
8	**.50**	**.60**	**.75**	36	30, 32, 40
9	**.50**	**.60**	**.75**	32	24, 30
10	**.50**	**.60**	**.75**	30	24, 32, 28
12	**.50**	**.60**	**.75**	28	24, 32
14	**.50**	**.60**	**.75**	24	20
16		**.60**	**.75**	22	20, 18
18		**.60**	**.75**	20	18
20		**.60**	**.75**	20	18, 16

For the best results, especially in automatic screw machine work, we strongly advise against using 5/8″ diameter dies to cut larger than No. 8, 13/16″ dies to cut larger than No. 12, or 1″ dies to cut larger than No. 16.

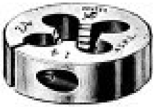
* 5/8″ diameter dies are furnished without adjusting screw only.

Adjustable Round Split Dies

Fractional Sizes

Outside Diameters

5/8" 13/16" 1"



With
Adjusting Screw

Without
Adjusting Screw

United States Standard form of thread furnished unless otherwise specified.

Sizes and threads not listed are subject to special prices.

Left-Hand Dies are special.

Read page 105.

SIZES AND PRICES

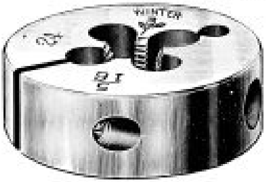
Cutting Size Inches	Outside Diameter Price Each			Number of Threads to the Inch				
				Standard Pitches				Other U. S. Form Threads also Furnished
	*5/8" Diam. 1/4" Thick	13/16" Diam. 1/4" Thick	1" Diam. 3/8" Thick	U. S. St'd.	S. A. E. St'd.	Whitworth St'd.	British St'd. Fine	
1/16	**$0.80**	**$0.90**		64		60		72
5/64	**.70**	**.80**		60				72
3/32	**.60**	**.70**		50		48		48
7/64	**.50**	**.60**		48				
1/8	**.50**	**.60**	**$0.75**	40		40		32
9/64	**.50**	**.60**	**.75**	40				
5/32	**.50**	**.60**	**.75**	36		32		32
11/64	**.50**	**.60**	**.75**	32				
3/16	**.50**	**.60**	**.75**	24		24		32
13/64	**.50**	**.60**	**.75**	24				
7/32	**.50**	**.60**	**.75**	24		24		32
15/64	**.50**	**.60**	**.75**	24				
1/4	**.50**	**.60**	**.75**	20	28	20	26	24, 27, 32
5/16		**.60**	**.75**	18	24	18	22	20, 27, 32
3/8			**.75**	16	24	16	20	20, 27
7/16			**.75**	14	20	14	18	24, 27

For the best results, especially for automatic screw machine work, we advise against the use of 5/8" diameter dies to cut larger than 11/64", 13/16" dies to cut larger than 13/64", and 1" dies to cut larger than 1/4", except for fine pitches.

* 5/8" diameter dies are furnished without adjusting screw only.

Adjustable Round Split Dies

Fractional Sizes



With Adjusting Screw

Without Adjusting Screw

Outside Diameters

1 5/16″ 1 1/2″ 1 9/16″ 1 3/4″

United States Standard form of thread furnished unless otherwise specified.

All sizes and threads not listed are special.

Dies with Left-Hand threads are special. Read page 105.

SIZES AND PRICES

Cutting Size Inches	Outside Diameter—Price Each				Number of Threads to the Inch				
	1 5/16″ Diameter 5/16″ Thick	1 1/2″ Diameter 1/2″ Thick	1 9/16″ Diameter 9/16″ Thick	1 3/4″ Diameter 9/16″ Thick	Standard Pitches				Other U. S. Threads also Furnished
					U.S. Std.	S. A. E. Std.	Whitworth Std.	British Std. Fine	
1/4	$1.25	$1.25	$1.50	$2.00	20	28	20	26	24, 27, 32
5/16	1.25	1.25	1.50	2.00	18	24	18	22	20, 27, 32
3/8	1.25	1.25	1.50	2.00	16	24	16	20	20, 27
7/16	1.25	1.25	1.50	2.00	14	20	14	18	24, 27
1/2	1.25	1.25	1.50	2.00	13	20	12	16	12, 24, 27
9/16		1.25	1.50	2.00	12	18	12	16	27
5/8		1.25	1.50	2.00	11	18	11	14	12, 27
11/16				2.00	11	16	11	14	
3/4				2.00	10	16	10	12	12, 27

Except for fine pitches, dies of the above diameters should not be used to cut larger sizes than as follows: 1 5/16″—3/8″, 1 1/2″—1/2″, 1 9/16″—9/16″, 1 3/4″—5/8″.

Adjustable Round Split Dies

Fractional Sizes

With or Without Adjusting Screw
Outside Diameters
2″ 2¼″ 2½″ 3″

United States Standard form of thread furnished unless otherwise specified.

All sizes and threads not listed are special.

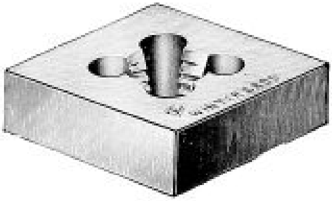
Dies with Left-Hand threads are special. Read page 105.

SIZES AND PRICES

Cutting Size Inches	Outside Diameter—Price Each				Number of Threads to the Inch				
	2″ Diameter ⅝″ Thick	2¼″ Diameter ¾″ Thick	2½″ Diameter ¾″ Thick	3″ Diameter 1⅛″ Thick	Standard Pitches				Other U. S. Threads also Furnished.
					U. S. Std.	S. A. E. Std.	Whitworth Std.	British Std. Fine	
¼	**$2.00**	**$3.00**			20	28	20	26	24, 27, 32
5/16	**2.00**	**3.00**			18	24	18	22	20, 27, 32
⅜	**2.00**	**3.00**			16	24	16	20	20, 27
7/16	**2.00**	**3.00**			14	20	14	18	24, 27
½	**2.00**	**3.00**	**$3.00**		13	20	12	16	12, 24, 27
9/16	**2.00**	**3.00**	**3.00**		12	18	12	16	27
⅝	**2.00**	**3.00**	**3.00**		11	18	11	14	12, 27
11/16	**2.00**	**3.00**	**3.00**		11	16	11	14	
¾	**2.00**	**3.00**	**3.00**		10	16	10	12	12, 27
13/16	**2.00**	**3.00**	**3.00**		10		10	12	
⅞	**2.00**	**3.00**	**3.00**	**$5.00**	9	14, 18	9	11	12, 27
15/16		**3.00**	**3.00**	**5.00**	9		9		
1″		**3.00**	**3.00**	**5.00**	8	14	8	10	12, 27
1⅛				**5.00**	7	12	7	9	
1¼				**5.00**	7	12	7	9	
1⅜				**5.00**	6	12	6	8	
1½				**5.00**	6	12	6	8	

Except for fine pitches, dies of the above diameters should not be used to cut larger sizes than as follows: 2″—⅝″, 2¼″—¾″, 2½″—1″, 3″—1¼″.

Solid Square Bolt Dies



U. S. Standard thread only will be furnished regularly.

All sizes and threads not listed are special, and subject to special prices.

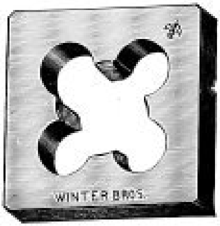
Left-Hand Dies are special.

Solid Square Bolt Dies

SIZES AND PRICES

Cutting Size Inches	Price Each	No. of Threads to the Inch U. S. Standard	Size of Square Inches	Thickness Inches
¼	**$1.80**	20	2½	½
5/16	**1.80**	18	2½	½
⅜	**1.80**	16	2½	½
7/16	**1.80**	14	2½	½
½	**1.80**	13	2½	¾
9/16	**1.90**	12	2½	¾
⅝	**2.00**	11	2½	¾
11/16	**2.10**	11	2½	¾
¾	**2.20**	10	2½	¾
13/16	**2.30**	10	2½	¾
⅞	**2.40**	9	2½	¾
15/16	**2.55**	9	2½	¾
1	**2.70**	8	2½	1
1⅛	**3.00**	7	2½	1
1¼	**3.30**	7	2½	1
1⅜	**3.60**	6	2½	1
1½	**3.90**	6	3	1
1⅝	**4.20**	5½	3	1
1¾	**5.40**	5	3	1¼
1⅞	**6.50**	5	3½	1½
2	**7.50**	4½	3¾	2

Solid Square Pipe Dies


WINTER BROS.

Left-Hand Dies are Special

SIZES AND PRICES

Cutting Size Pipe Inches	Size of Square, Thickness, Price Each					
	2" Square ½" Thick	2¼" and 2½" Square ⅝" Thick	2¾" and 3" Square ¾" Thick	3½" Square ⅞" and 1" Thick	4" Square ⅞" and 1" Thick	5" Square 1¼" Thick
⅛	$1.80	$1.80				
¼	1.90	1.90				
⅜	2.10	2.10				
½	2.40	2.40	$3.10			
¾		3.00	3.45			
1		3.60	3.75	$5.00	$5.00	
1¼			5.40	6.50	6.50	
1½				7.50	7.50	
2				8.50	8.50	
2½						$12.50
3						15.00

Furnished regularly in right-hand, Briggs' standard only.

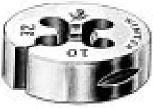
The diameter of these dies at the small end is such that the Briggs' Standard Plug Gauge will screw approximately flush with the face of the die.

See round dies for pipe, page 64.

Adjustable Round Split Dies

British Association Standard

With Adjusting Screw



Without Adjusting Screw

Sizes, dimensions and threads not listed are subject to special prices.

Left-hand dies are special.

SIZES AND PRICES

Number	Outside Diameter — Price Each		Diameter mm.	Pitch, mm.
	5/8 Inch	13/16 Inch		
0	**$0.50**	**$0.60**	6.0	1.00
1	**.50**	**.60**	5.3	.90
2	**.50**	**.60**	4.7	.81
3	**.50**	**.60**	4.1	.73
4	**.50**	**.60**	3.6	.66
5	**.50**	**.60**	3.2	.59
6	**.50**	**.60**	2.8	.53
7	**.50**	**.60**	2.5	.48
8	**.50**	**.60**	2.2	.43
9	**.50**	**.60**	1.9	.39
10	**.50**	**.60**	1.7	.35
12	**.70**	**.80**	1.3	.28
14	**1.00**	**1.10**	1.0	.23

5/8" diameter dies are furnished without adjusting screw only.

Die Stocks

Screw Plate Section

Adjustable Round Split Dies

French and International Standards.

⅝″–13/16″–1″–1 5/16″–1½″–1 9/16″ outside diameters.

Sizes, dimensions and threads not listed are subject to special prices.

Left-hand dies are special.

SIZES AND PRICES

Cutting Size mm.	Stand'd Pitch mm.		Outside Diameter — Price Each					
	French	International	*⅝″	13/16″	1″	1 5/16″	1½″	1 9/16″
2	...	.45	**$0.70**	**$0.80**	....	....	....	....
2.5	...	.45	**.60**	**.70**	....	....	....	....
3	.50	.60	**.50**	**.60**	....	....	....	....
3.5	...	.60	**.50**	**.60**	**$0.75**	....	....	....
4	.75	.75	**.50**	**.60**	**.75**	....	....	....
4.5	...	.75	**.50**	**.60**	**.75**	....	....	....
5	.75	.90	**.50**	**.60**	**.75**	....	....	....
5.5	...	.90	**.50**	**.60**	**.75**	....	....	....
6	1.0	1.0	**.50**	**.60**	**.75**	**$1.25**	**$1.25**	....
7	1.0	1.0	...	**.60**	**.75**	**1.25**	**1.25**	....
8	1.0	1.25	...	**.60**	**.75**	**1.25**	**1.25**	....
9	1.0	1.25	...	...	**.75**	**1.25**	**1.25**	**$1.50**
10	1.5	1.5	...	...	**.75**	**1.25**	**1.25**	**1.50**
11	...	1.5	...	...	**.75**	**1.25**	**1.25**	**1.50**
12	1.5	1.75	...	...	...	**1.25**	**1.25**	**1.50**
14	2.0	2.0	...	...	...	...	**1.25**	**1.50**
16	2.0	2.0	...	...	...	...	**1.25**	**1.50**

(Continued on next page.)

Cuts of these dies are shown on pages 48 to 51.

Furnished regularly with or without adjusting screw.

* ⅝″ dies are furnished without adjusting screw only.

Adjustable Round Split Dies

French and International Standards

1¾"–2"–2¼"–2½"–3" Outside Diameters

Sizes, dimensions and threads not listed are subject to special prices.

Left-hand dies are special.

SIZES AND PRICES

Cutting Size mm.	Standard Pitches mm.		Outside Diameter — Price Each				
	French	International	1¾"	2"	2¼"	2½"	3"
9	1.0	1.25	$2.00	....	....	....	....
10	1.5	1.5	2.00	....	....	....	....
11	...	1.5	2.00	....	....	....	....
12	1.5	1.75	2.00	$2.00	$3.00	$3.00	....
14	2.0	2.0	2.00	2.00	3.00	3.00	....
16	2.0	2.0	2.00	2.00	3.00	3.00	....
*18	2.5	2.5	2.00	2.00	3.00	3.00	....
20	2.5	2.5	2.00	2.00	3.00	3.00	....
22	2.5	2.5	....	2.00	3.00	3.00	$5.00
24	3.0	3.0	....	....	3.00	3.00	5.00
26	3.0	...	....	....	3.00	3.00	5.00
27	...	3.0	....	....	....	....	5.00
28	3.0	...	....	....	....	....	5.00
30	3.5	3.5	....	....	....	....	5.00
32	3.5	...	....	....	....	....	5.00
33	...	3.5	....	....	....	....	5.00
34	3.5	...	....	....	....	....	5.00
36	4.0	4.0	....	....	....	....	5.00
38	4.0	...	....	....	....	....	5.00

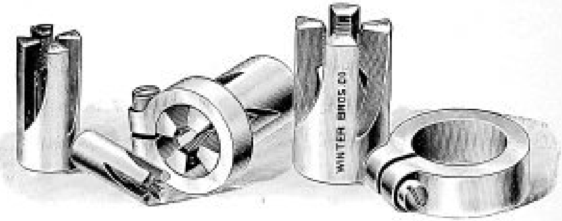
*This size is also furnished in 1.5 Pitch at regular price.

Cuts of these dies are shown on pages 48 to 51.

Furnished regularly with or without adjusting screw.

Spring Screw Threading Dies

Machine Screw Sizes
A. S. M. E. Standard



We believe that this is the best style of die for machine use.

They are easily adjusted and sharpened, and will average to cut threads better in form, lead and finish, than any other kind of die.

Clamp collars are not furnished with dies unless ordered.

Left-hand Dies are special.

When dies are for use on brass exclusively, orders should so specify.

SIZES AND PRICES

Screw Gauge No.	Outside Diameter Inches	Length Over-all Inches	Price Each		No. of Threads Per Inch	
			Die	Clamp Collar	Standard	Threads also Furnished
2	½	1¼	**$1.80**	**$0.50**	64	56
3	½	1¼	**1.80**	**.50**	56	48
4	½	1¼	**1.65**	**.50**	48	32, 36, 40
5	½	1¼	**1.50**	**.50**	44	36, 40
6	½	1¼	**1.50**	**.50**	40	32, 36
8	½	1¼	**1.50**	**.50**	36	30, 32, 40
8	¾	1¾	**1.75**	**.60**	36	30, 32, 40
10	¾	1¾	**1.75**	**.60**	30	24, 28, 32
12	¾	1¾	**1.75**	**.60**	28	24, 32
14	¾	1¾	**1.75**	**.60**	24	20

(Continued on next page)

Spring Screw Threading Dies

Fractional Sizes

U. S. Standard Threads sent unless otherwise specified.
Left-Hand Dies are special.

Cutting Size Inches	Outside Diameter Inches	Length Over-all Inches	Price Each		No. of Threads to the Inch		
			Die	Clamp Collar	U. S. Standard	S. A. E. Standard	Whitworth Stan'd.
1/8	1/2	1 1/4	**$1.50**	**$0.50**	40	—	40
3/16	1/2	1 1/4	**1.50**	**.50**	24	—	24
1/4	3/4	1 3/4	**1.75**	**.60**	20	28	20
5/16	3/4	1 3/4	**1.75**	**.60**	18	24	18
3/8	3/4	1 3/4	**1.75**	**.60**	16	24	16
5/16	1	2	**2.00**	**.70**	18	24	18
3/8	1	2	**2.00**	**.70**	16	24	16
7/16	1	2	**2.00**	**.70**	14	20	14
3/8	1 1/4	2 1/2	**2.00**	**.80**	16	24	16
7/16	1 1/4	2 1/2	**2.00**	**.80**	14	20	14
1/2	1 1/4	2 1/2	**2.00**	**.80**	13	20	12
9/16	1 1/4	2 1/2	**2.00**	**.80**	12	18	12
5/8	1 1/4	2 1/2	**2.00**	**.80**	11	18	11

Clamp Collars are sent only when order so specifies.

(Continued on next page.)

Spring Screw Threading Dies

Fractional Sizes

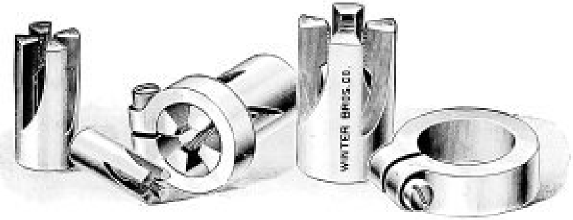
(Concluded)

Cutting Size Inches	Outside Diameter Inches	Length Over-all Inches	Price Each		Number of Threads to the Inch		
			Die	Clamp Collar	U. S. Standard	S. A. E. Standard	Whitworth Stan'd.
½	1⅜	2½	$2.40	$1.00	13	20	12
9/16	1⅜	2½	2.40	1.00	12	18	12
⅝	1⅜	2½	2.40	1.00	11	18	11
11/16	1⅜	2½	2.40	1.00	11	16	11
¾	1⅜	2½	2.40	1.00	10	16	10
⅝	1⅝	2½	2.75	1.00	11	18	11
¾	1⅝	2½	2.75	1.00	10	16	10
⅞	1⅝	2½	2.75	1.00	9	14, 18	9
¾	2	3	3.50	1.25	10	16	10
⅞	2	3	3.50	1.25	9	14, 18	9
1	2	3	3.50	1.25	8	14	8
1⅛	2	3	3.50	1.25	7	12	7
1	2½	3½	6.00	2.00	8	14	8
1⅛	2½	3½	6.00	2.00	7	12	7
1¼	2½	3½	6.00	2.00	7	12	7
1⅜	2½	3½	6.00	2.00	6	12	6
1½	2½	3½	6.00	2.00	6	12	6

Clamp collars are sent only when order so specifies.

Spring Screw Threading Dies

French and International Standards



These Dies are adjustable by means of a Clamp Collar. This Clamp Collar is not furnished with the dies unless so ordered.

Sizes, lengths and threads not listed are subject to special prices.

Left-hand dies are special.

SIZES AND PRICES

Cutting Size m/m	Outside Diameter Inches	Length Overall Inches	Price Each		Standard Pitch m/m	
			Die	Clamp Collar	French	International
6	¾	1¾	**$1.75**	**$0.60**	1.0	1.0
7	¾	1¾	**1.75**	**.60**	1.0	1.0
8	¾	1¾	**1.75**	**.60**	1.0	1.25
9	¾	1¾	**1.75**	**.60**	1.0	1.25
10	¾	1¾	**1.75**	**.60**	1.5	1.5
8	1	2	**2.00**	**.70**	1.0	1.25
9	1	2	**2.00**	**.70**	1.0	1.25
10	1	2	**2.00**	**.70**	1.5	1.5
11	1	2	**2.00**	**.70**	. . .	1.5

(List concluded on following page)

Spring Screw Threading Dies

French and International Standards

SIZES AND PRICES

Cutting Size m/m	Outside Diameter Inches	Length Over-all Inches	Price Each		Standard Pitch m/m	
			Die	Clamp Collar	French	Intern'l
10	1¼	2½	$2.00	$0.80	1.5	1.5
11	1¼	2½	2.00	.80	...	1.5
12	1¼	2½	2.00	.80	1.5	1.75
14	1¼	2½	2.00	.80	2.0	2.0
16	1¼	2½	2.00	.80	2.0	2.0
16	1⅝	2½	2.75	1.00	2.0	2.0
18	1⅝	2½	2.75	1.00	2.5	2.5
20	1⅝	2½	2.75	1.00	2.5	2.5
22	1⅝	2½	2.75	1.00	2.5	2.5
24	1⅝	2½	2.75	1.00	3.0	3.0
20	2	3	3.50	1.25	2.5	2.5
22	2	3	3.50	1.25	2.5	2.5
24	2	3	3.50	1.25	3.0	3.0
26	2	3	3.50	1.25	3.0	...
27	2	3	3.50	1.25	...	3.0
28	2	3	3.50	1.25	3.0	...
30	2	3	3.50	1.25	3.5	3.5
26	2½	3½	6.00	2.00	3.0	...
27	2½	3½	6.00	2.00	...	3.0
28	2½	3½	6.00	2.00	3.0	...
30	2½	3½	6.00	2.00	3.5	3.5
32	2½	3½	6.00	2.00	3.5	...
33	2½	3½	6.00	2.00	...	3.5
34	2½	3½	6.00	2.00	3.5	...
36	2½	3½	6.00	2.00	4.0	4.0
38	2½	3½	6.00	2.00	4.0	...

(Concluded)

WE have proven that high speed steel taps and dies, in some classes of work, are from **five to fifteen times** more efficient than those made of carbon steel.

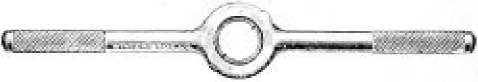
Tell us the metal you are working in, the conditions under which the tools are being used, including the speed, kind of lubricant and method of applying, also whether the tools break or wear out.

Get the benefit of our experience, it may pay you.

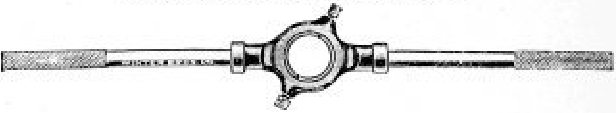
Solid Die Stocks

For Round Solid and Round Adjustable Dies

Type of stock furnished in No. 1–2–3–3½.



Type of stock furnished in larger sizes.



SIZES AND PRICES

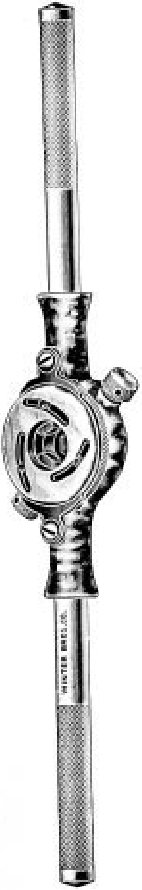
Number	Outside Diameter of Dies	Length of Stock	Price Each
1	5/8"	5"	**$0.75**
2	11/16"	7"	**1.00**
3	1"	10"	**1.25**
3½	1 5/16"	12"	**1.75**
4	1½"	14"	**2.00**
4½	1 5/16"	14"	**2.00**
4¾	1¾"	22"	**2.50**
5	2"	22"	**2.50**
5½	2¼"	30"	**3.50**
6	2½"	30"	**3.50**
7	3"	40"	**6.00**

Adjustable Round Dies for Pipe

Taper Threads. With Adjusting Screw or Without

Right-Hand Briggs' Standard Taper furnished regularly. Left-Hand Dies are special.

Cutting Size Pipe Inches	No. of Threads to the Inch	Outside Diameter—Price Each						
		1"	1 5/16"	1½"	1 13/16"	2"	2¼"	2½"
⅛	27	**$0.75**	**$1.25**	**$1.25**	**$1.50**	**$2.00**	**$3.00**	**$3.00**
¼	18		**1.25**	**1.25**	**1.50**	**2.00**	**3.00**	**3.00**
⅜	18			**1.50**	**1.50**	**2.00**	**3.00**	**3.00**
½	14				**1.75**	**2.00**	**3.00**	**3.00**
¾	14						**3.25**	**3.25**
1	11½						**3.50**	**3.50**


WINTER BROS. CO.

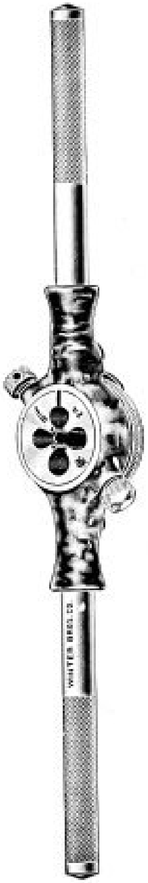
Adjustable Guide Die Stocks

It is very difficult to start a die true if it is operated in a stock without a guide, and it is almost impossible to have solid guides, either in the form of collets or part of the die stock, that will be a good fit on various classes of work that must be threaded.

The adjustable guide forming part of these die stocks can be instantly set to fit any size within its range.

Price List

No. 13. Adjustable guide stock 9″ long for dies 1″ diam.	$2.00
No. 14. Adjustable guide stock 14″ long for dies 1½″ diam.	3.25
No. 15. Adjustable guide stock 23″ long for dies 2″ diam.	4.00
No. 16. Adjustable guide stock 27½″ long for dies 2½″ diam.	5.00
No. 17. Adjustable guide stock 40″ long for dies 3″ diam.	10.00


WINTER BROS. CO.

Die Stocks

Screw Plate Section

Index to Screw Plate Section

Machine Screw Sizes

No.		Page
1	4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}	68
2	2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}	68
3	2^{56}, 3^{48}, 4^{36}, 5^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}	68
4	4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}	69
5	4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}	69
6	2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}, 14^{20}	69
7	2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}	70
8	A. S. M. E. 4^{48}, 6^{40}, 8^{36}, 10^{30}, 12^{28}	70
9	A. S. M. E. 2^{64}, 3^{56}, 4^{48}, 6^{40}, 8^{36}, 10^{30}, 12^{28}, 14^{24}	70
14	12^{24}, 14^{20}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	71
14A	12^{24}, 14^{20}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	74
15	10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	71
15A	10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	74
16	A. S. M. E. 12^{28}, 14^{24}, 16^{22}, 18^{20}, 20^{20}, 20^{18}	71
16A	A. S. M. E. 12^{28}, 14^{24}, 16^{22}, 18^{20}, 20^{20}, 20^{18}	74

Fractional Sizes

10	${\frac{1}{8}}^{40}$, ${\frac{5}{32}}^{36}$, ${\frac{3}{16}}^{24}$, ${\frac{7}{32}}^{24}$, ${\frac{1}{4}}^{20}$	70
11	${\frac{1}{16}}^{64}$, ${\frac{3}{32}}^{50}$, ${\frac{1}{8}}^{40}$, ${\frac{5}{32}}^{36}$, ${\frac{3}{16}}^{24}$, ${\frac{3}{16}}^{32}$, ${\frac{7}{32}}^{24}$, ${\frac{1}{4}}^{20}$	70
12	${\frac{1}{4}}^{20}$, ${\frac{5}{16}}^{18}$, ${\frac{3}{8}}^{16}$, ${\frac{7}{16}}^{14}$	72
12A	${\frac{1}{4}}^{20}$, ${\frac{5}{16}}^{18}$, ${\frac{3}{8}}^{16}$, ${\frac{7}{16}}^{14}$	73
13	${\frac{3}{16}}^{24}$, ${\frac{7}{32}}^{24}$, ${\frac{1}{4}}^{20}$, ${\frac{5}{16}}^{18}$, ${\frac{3}{8}}^{16}$, ${\frac{7}{16}}^{14}$	72
13A	${\frac{3}{16}}^{24}$, ${\frac{7}{32}}^{24}$, ${\frac{1}{4}}^{20}$, ${\frac{5}{16}}^{18}$, ${\frac{3}{8}}^{16}$, ${\frac{7}{16}}^{14}$	73

(Continued on next page)

Index to Screw Plate Section—Concluded

Continuation of Fractional Sizes

No.		Page
17 & 17P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	75
18 & 18P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$	75
19 & 19P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	75
20 & 20P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$	76
23 & 23P	$\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	76
24 & 24P	$\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	76

Screw Plates with Two Die Stocks and Two Tap Wrenches

21 & 21P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	78
22 & 22P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$	78
25 & 25P	$\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	77

S. A. E. Standard Screw Plates for Automobile Repair Work

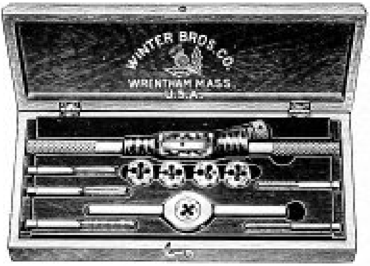
17 S. A. E. & 17M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$	80
18 S. A. E. & 18M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$	80
19 S. A. E. & 19M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$	80
20 S. A. E. & 20M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$	81
23 S. A. E. & 23M	$\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, $1''^{14}$	81
24 S. A. E. & 24M	$\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, $1''^{14}$	81

S. A. E. Standard Screw Plates for Automobile Repair Work, with Two Die Stocks and Two Tap Wrenches

21 S. A. E. & 21M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$	82
22 S. A. E. & 22M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$	82
25 S. A. E. & 25M	$\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, $1''^{14}$	83
100	4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24} $\frac{1}{4}^{20}$, $\frac{1}{4}^{24}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, U. S. Stand. $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, S. A. E. Std.	79

The letters "P" and "M" indicate screw plates with plain solid die stocks; all other screw plates listed on this page are furnished with adjustable guide die stocks.

Thistle Brand Screw Plates



⅝″

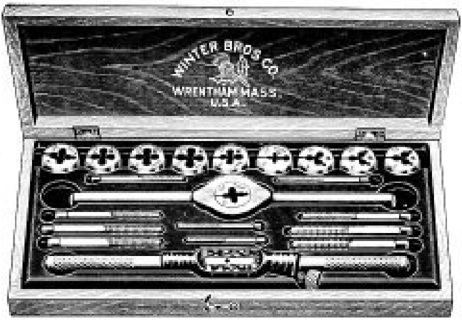
Round Adjustable Dies

Solid Die Stocks

	Price Each
Set No. 1	
5 Taps, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24} 5 Dies ⅝″ in diameter 1 Solid die stock 5″ long 1 Tap wrench, capacity $\frac{1}{16}$″—¼″	**$7.80**
Set No. 2	
7 Taps, 2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24} 7 Dies ⅝″ in diameter 1 Solid die stock 5″ long 1 Tap wrench, capacity $\frac{1}{16}$″—¼″	**9.90**
Set No. 3	
9 Taps, 2^{56}, 3^{48}, 4^{36}, 5^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24} 9 Dies ⅝″ in diameter 1 Solid die stock 5″ long 1 Tap wrench, capacity $\frac{1}{16}$″—¼″	**11.60**

Die stocks listed on page 64.
Tap wrenches listed on page 45.

Thistle Brand Screw Plates



$\frac{13}{16}''$

Round Adjustable Dies

Solid Die Stocks

Set No. 4

Price Each

5 Taps, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}
5 Dies $\frac{13}{16}''$ in diameter
1 Solid die stock 7″ long
1 Tap wrench, capacity $\frac{1}{16}''$—$\frac{1}{4}''$ **$ 8.50**

Set No. 5

8 Taps, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}
8 Dies $\frac{13}{16}''$ in diameter
1 Solid die stock 7″ long
1 Tap wrench, capacity $\frac{1}{16}''$—$\frac{1}{4}''$ **12.00**

Set No. 6

8 Taps, 2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 12^{24}, 14^{20}
8 Dies $\frac{13}{16}''$ in diameter
1 Solid die stock 7″ long
1 Tap wrench, capacity $\frac{1}{16}''$—$\frac{1}{4}''$ **12.00**

Die stocks listed on page 64.
Tap wrenches listed on page 45.

Thistle Brand Screw Plates

$\frac{13}{16}''$

Round Adjustable Dies

Solid Die Stocks

Set No. 7

	Price Eac
10 Taps, 2^{56}, 3^{48}, 4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24} 10 Dies $\frac{13}{16}''$ in diameter 1 Solid die stock 7″ long 1 Tap wrench, capacity $\frac{1}{16}''$—¼″	**$14.00**

Set No. 8

5 Taps A. S. M. E. standard, 4^{36}, 6^{40}, 8^{36}, 10^{30}, 12^{28} 5 Dies $\frac{13}{16}''$ in diameter 1 Solid die stock 7″ long 1 Tap wrench, capacity $\frac{1}{16}''$—¼″	**8.50**

Set No. 9

8 Taps A. S. M. E. standard, 2^{64}, 3^{56}, 4^{48}, 6^{40}, 8^{36}, 10^{30}, 12^{28}, 14^{24} 8 Dies $\frac{13}{16}''$ in diameter 1 Solid die stock 7″ long 1 Tap wrench, capacity $\frac{1}{16}''$—¼″	**12.00**

Set No. 10

5 Taps, $\frac{1}{8}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$ 5 Dies $\frac{13}{16}''$ in diameter 1 Solid die stock 7″ long 1 Tap wrench, capacity $\frac{1}{16}''$—¼″	**8.60**

Set No. 11

8 Taps, $\frac{1}{16}^{64}$, $\frac{3}{32}^{48}$ $\frac{1}{8}^{40}$, $\frac{5}{32}^{36}$, $\frac{3}{16}^{24}$, $\frac{3}{16}^{32}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$ 8 Dies $\frac{13}{16}''$ in diameter 1 Solid die stock 7″ long 1 Tap wrench, capacity $\frac{1}{16}''$—¼″	**12.00**

Unless otherwise ordered the above screw plates in fractional sizes will be furnished in **U. S. Standard.** **Whitworth standard** threads furnished at same prices.

Die stocks listed on page 64.

Tap wrenches listed on page 45.

Thistle Brand Screw Plates

1″

Round Adjustable Dies

Solid Die Stocks

Set No. 14

	Price Each
6 Taps, 12^{24}, 14^{20}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	
6 Dies 1″ in diameter	
1 Solid die stock 10″ long	
1 Tap wrench, capacity ¼″—½″	**$12.70**

Set No. 15

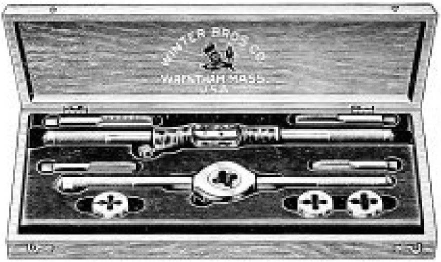
9 Taps, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}, 16^{18}, 18^{18} 20^{16}, 20^{18}	
9 Dies 1″ in diameter	
1 Solid die stock 10″ long	
1 Tap wrench, capacity ¼″—½″	**16.20**

Set No. 16

6 Taps A. S. M. E. standard, 12^{28}, 14^{24}, 16^{22}, 18^{20}, 20^{16}, 20^{18}	
6 Dies 1″ in diameter	
1 Solid die stock 10″ long	
1 Tap wrench, capacity ¼″—½″	**12.70**

Die stocks furnished with above plates listed on page 64.
Tap wrenches listed on page 45.

Thistle Brand Screw Plates



1″

Round Adjustable Dies

Solid Die Stocks

	Price Each
Set No. 12	
4 Taps, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$	
4 Dies 1″ in diameter	
1 Solid die stock 10″ long	
1 Tap wrench, capacity ¼″—½″	**$10.60**
Set No. 13	
6 Taps, $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$	
6 Dies 1″ in diameter	
1 Solid die stock 10″ long	
1 Tap wrench, capacity ¼″—½″	**13.10**

The die stocks furnished with above plates are listed on page 64.

The tap wrenches are listed on page 45.

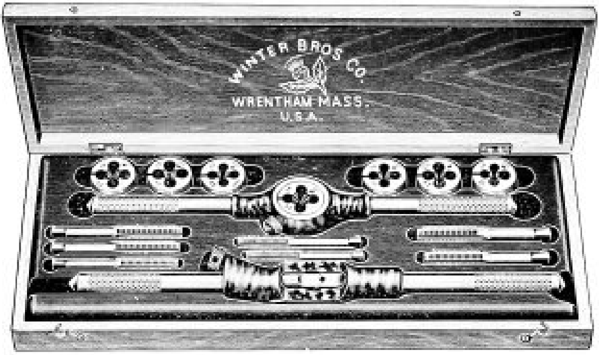
Taper taps are furnished with these plates unless otherwise specified.

Unless otherwise ordered we will furnish **U. S. standard** in all fractional sizes.

Whitworth standards will be furnished at same prices.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks



1″ Round Adjustable Dies

Set No. 12A

	Price Each
4 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$ 4 Dies 1″ in diameter 1 No. 13 stock with adjustable guide, 9″ long 1 Tap wrench, capacity ¼″—½″	$11.90

Set No. 13A

6 Taps $\frac{3}{16}^{24}$, $\frac{7}{32}^{24}$, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$ 6 Dies 1″ in diameter 1 No. 13 stock with adjustable guide, 9″ long 1 Tap wrench, capacity ¼″—½″	14.40

The die stocks furnished with above plates are listed on page 65 of this catalogue.

The tap wrenches are listed on page 45.

Taper taps are furnished with these plates unless otherwise specified.

Unless otherwise ordered we will furnish **U. S. standard** in all fractional sizes. **Whitworth standards** will be furnished at same prices.

Above plates with plain solid die stocks listed on page 72.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks

1″

Round Adjustable Dies

Set No. 14A

	Price Each
6 Taps 12^{24}, 14^{20}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	
6 Dies 1″ in diameter	
1 No. 13 stock with adjustable guide, 9″ long	
1 Tap wrench, capacity ¼″—½″	**$14.00**

Set No. 15A

9 Taps 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}, 16^{18}, 18^{18}, 20^{16}, 20^{18}	
9 Dies 1″ in diameter	
1 No. 13 stock with adjustable guide, 9″ long	
1 Tap wrench, capacity ¼″—½″	**17.60**

Set No. 16A

6 A. S. M. E. standard taps 12^{28}, 14^{24}, 16^{22}, 18^{20}, 20^{16}, 20^{18}	
6 Dies 1″ in diameter	
1 No. 13 stock with adjustable guide, 9″ long	
1 Tap wrench, capacity ¼″—½″	**14.00**

The die stocks furnished with above plates are listed on page 65.
The tap wrenches are listed on page 45.
Above plates with plain solid die stocks are listed on page 71.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks
or Plain Solid Die Stocks

Round Adjustable Dies

Set No. 17

	Price Each
5 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	
5 Dies 1½" in diameter	
1 No. 14 stock with adjustable guide, 14" long	
1 Tap wrench, capacity ¼"—½"	**$18.00**
No. 17P with plain solid die stock	**16.00**

Set No. 18

7 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$	
7 Dies 1½" in diameter	
1 No. 14 stock with adjustable guide, 14" long	
1 Tap wrench, capacity ¼"—¾"	**22.30**
No. 18P with plain solid die stock	**20.30**

Set No. 19

7 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	
7 Dies 2" in diameter	
1 No. 15 stock with adjustable guide, 23" long	
1 Tap wrench, capacity ¼"—¾"	**30.90**
No. 19P with plain solid die stock	**28.30**

The die stocks furnished with above plates are listed on page 64-65.

Tap wrenches are listed on page 45.

Taper taps are furnished with these plates unless otherwise specified.

Unless otherwise ordered we will furnish **U. S. standard.**

Whitworth standard will be furnished at same prices.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks
or Plain Solid Die Stocks

Round Adjustable Dies

Set No. 20

	Price Each
9 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$	
9 Dies 2″ in diameter	
1 No. 15 stock with adjustable guide, 23″ long	
1 Tap wrench, capacity ¼″—¾″	$37.20
No. 20P with plain solid die stock	**34.70**

Set No. 23

5 Taps $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	
5 Dies 2½″ in diameter	
1 No. 16 stock with adjustable guide, 27½″ long	
1 Tap wrench, capacity ¼″—1″	36.40
No. 23P with plain solid die stock	**33.50**

Set No. 24

7 Taps $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	
7 Dies 2½″ in diameter	
1 No. 16 stock with adjustable guide, 27½″ long	
1 Tap wrench, capacity ¼″—1″	45.10
No. 24P with plain solid die stock	**42.20**

The die stocks furnished with above plates are listed on pages 64-65.

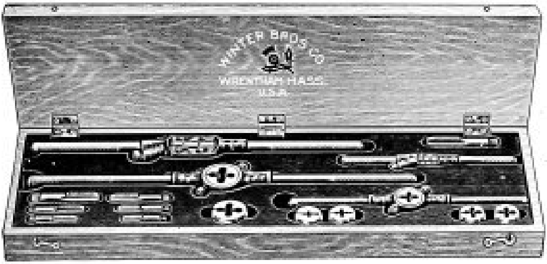
Tap wrenches are listed on page 45.

Taper taps are furnished with these plates unless otherwise specified.

Unless otherwise ordered we will furnish **U. S. Standard. Withworth standard** furnished at same prices in standard pitches only.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks
or Plain Solid Die Stocks



Round Adjustable Dies, Two Stocks and Two Tap Wrenches

Set No. 25

	Price Each
9 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	
5 Dies $1\frac{1}{2}''$ in diameter, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	
4 Dies $2\frac{1}{2}''$ in diameter, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''^{8}$	
1 No. 14 stock with adjustable guide, 14" long	
1 No. 16 stock with adjustable guide, $27\frac{1}{2}''$ long	
1 Tap wrench, capacity $\frac{1}{4}''$—$\frac{1}{2}''$	
1 Tap wrench, capacity $\frac{1}{4}''$—1"	**$49.00**
No. 25P with plain solid die stock	**44.10**

Taper taps of **U. S. standard** furnished unless otherwise specified. **Whitworth standard** furnished at the same prices.

Tap wrenches are listed on page 45.
Die stocks are listed on pages 64-65.

Thistle Brand Screw Plates

With Adjustable Guide Die Stocks
or Plain Solid Die Stocks

Round Adjustable Dies, Two Stocks and Two Tap Wrenches

Set No. 21

	Price Each
7 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	
5 Dies $1\frac{1}{2}''$ in diameter, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	
2 Dies 2″ in diameter $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$	
1 No. 14 stock with adjustable guide, 14″ long	
1 No. 15 stock with adjustable guide, 23″ long	
1 Tap wrench, capacity ¼″—½″	
1 Tap wrench, capacity ¼″—1″	**$34.80**
No. 21P with plain solid die stock	**30.10**

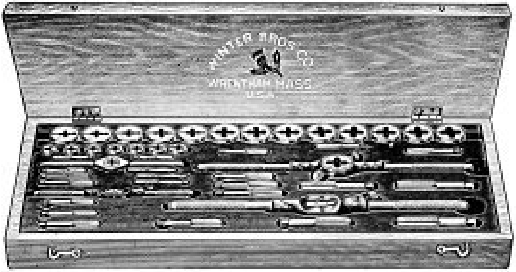
Set No. 22

	Price Each
9 Taps $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$	
5 Dies $1\frac{1}{2}''$ in diameter, $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$	
4 Dies 2″ in diameter, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{11}{16}^{11}$, $\frac{3}{4}^{10}$	
1 No. 14 stock with adjustable guide, 14″ long	
1 No. 15 stock with adjustable guide, 23″ long	
1 Tap wrench, capacity ¼″—½″	
1 Tap wrench, capacity ¼″—1″	**41.30**
No. 22P with plain solid die stock	**36.70**

Die stocks furnished with above plates are listed on pages 64-65.
Tap wrenches are listed on page 45.
Taper taps furnished unless otherwise specified.
Unless otherwise ordered, **U. S. standard** will be furnished.
Withworth standard furnished at same prices.

Thistle Brand Screw Plates

For Automobile Repair Work



Consisting of Machine Screw Sizes,
V or U. S. Standard Sizes,
S. A. E. Standard Sizes.

Set No. 100

	Price Each
8 Taps 4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}	
8 $\frac{13}{16}$″ dies 4^{36}, 6^{32}, 8^{32}, 10^{24}, 10^{32}, 12^{24}, 14^{20}, 14^{24}	
7 Taps U. S. S. threads, $\frac{1}{4}^{20}$, $\frac{1}{4}^{24}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$	
7 Dies $1\frac{1}{2}$″ in diameter, $\frac{1}{4}^{20}$, $\frac{1}{4}^{24}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$	
7 Taps S. A. E. standard, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$	
7 Dies $1\frac{1}{2}$″ in diameter, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$	
1 solid die stock 7″ long	
1 Tap wrench, capacity $\frac{1}{16}$″—$\frac{1}{4}$″	
1 No. 14 die stock with adjustable guide, 14″ long	
1 Tap wrench, capacity $\frac{1}{4}$″—$\frac{3}{4}$″	**$45.80**

Tap wrenches are listed on page 45.

Die stocks are listed on pages 64, 65.

Thistle Brand Screw Plates

For Automobile Repair Work
With Adjustable Guide Die Stocks
or Plain Solid Die Stocks

Round Adjustable Dies

S. A. E. Standard

Set No. 17 S. A. E.

	Price Each
5 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$	
5 Dies 1½" in diameter	
1 No. 14 stock with adjustable guide, 14" long	
1 Tap wrench, capacity ¼"—½"	$18.00
No. 17M with plain solid die stock	**16.00**

Set No. 18 S. A. E.

7 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$	
7 Dies 1½" in diameter	
1 No. 14 die stock with adjustable guide	
1 Tap wrench, capacity ¼"—¾"	22.30
No. 18M with plain solid die stock	**20.30**

Set No. 19 S. A. E.

7 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$	
7 Dies 2" in diameter	
1 No. 15 stock, with adjustable guide, 23" long	
1 Tap wrench, capacity ¼"—¾"	30.90
No. 19M with plain solid die stock	**28.30**

Die stocks are listed on pages 64-65.
Tap wrenches are listed on page 45.

Thistle Brand Screw Plates

For Automobile Repair Work
With Adjustable Guide Die Stocks
or Plain Solid Die Stocks

Round Adjustable Dies

S. A. E. Standard

Set No. 20 S. A. E.

	Price Each
9 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$	
9 Dies 2″ in diameter	
1 No. 15 stock with adjustable guide, 23″ long	
1 Tap wrench, capacity $\frac{1}{4}$″—$\frac{3}{4}$″	$37.20
No. 20M with plain solid die stock	**34.70**

Set No. 23 S. A. E.

5 Taps $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, 1″^{14}	
5 Dies $2\frac{1}{2}$″ in diameter	
1 No. 16 die stock with adjustable guide, $27\frac{1}{2}$″ long	
1 Tap wrench, capacity $\frac{1}{4}$″—1″	36.40
No. 23M with plain solid die stock	**33.50**

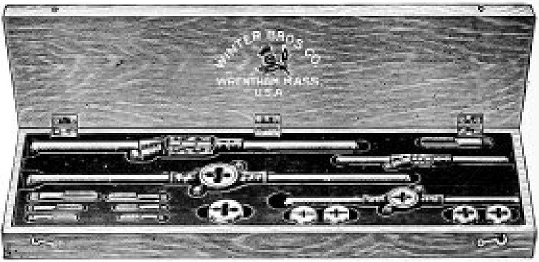
Set No. 24 S. A. E.

7 Taps $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, 1″^{14}	
7 Dies $2\frac{1}{2}$″ in diameter	
1 No. 16 die stock with adjustable guides, $27\frac{1}{2}$″ long	
1 Tap wrench, capacity $\frac{1}{4}$″—1″	45.10
With extra $\frac{7}{8}^{18}$ tap and die	49.90
No. 24M with plain solid die stock	**43.20**
With extra $\frac{7}{8}^{18}$ tap and die	**48.00**

Die stocks are listed on pages 64-65.
Tap wrenches are listed on page 45.

Thistle Brand Screw Plates

For Automobile Repair Work
With Adjustable Guide Die Stocks
or Plain Solid Die Stocks



Round Adjustable Dies, Two Stocks and Two Tap Wrenches

Set No. 21 S. A. E.

	Price Each
7 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$	
5 Round dies $1\frac{1}{2}''$ in diameter, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$	
2 Round dies 2″ in diameter, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$	
1 No. 14 die stock with adjustable guide, 14″ long	
1 No. 15 die stock with adjustable guide, 23″ long	
1 Tap wrench, capacity $\frac{1}{4}''$—$\frac{1}{2}''$	
1 Tap wrench, capacity $\frac{1}{4}''$—1″	**$34.80**
No. 21M with plain solid die stocks	**30.10**

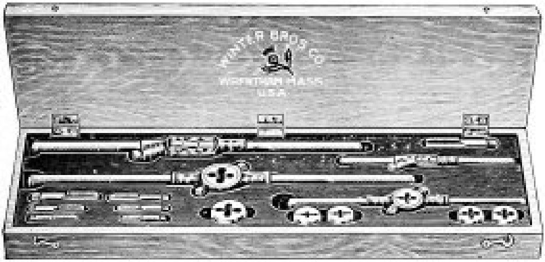
Set No. 22 S. A. E.

9 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{9}{16}^{18}$ $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$	
5 Round dies $1\frac{1}{2}''$ in diameter, $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$	
4 Round dies 2″ in diameter, $\frac{9}{16}^{18}$, $\frac{5}{8}^{18}$, $\frac{11}{16}^{16}$, $\frac{3}{4}^{16}$	
1 No. 14 die stock with adjustable guide, 14″ long	
1 No. 15 die stock with adjustable guide, 23″ long	
1 Tap wrench, capacity, $\frac{1}{4}''$—$\frac{1}{2}''$	
1 Tap wrench, capacity, $\frac{1}{4}''$—1″	**41.30**
No. 22M with plain solid die stocks	**36.70**

Die stocks furnished with above plates are listed on pages 64-65.
Tap wrenches are listed on page 45.

Thistle Brand Screw Plates

For Automobile Repair Work



Round Adjustable Dies, Two Stocks and Two Tap Wrenches

Set No. 25 S. A. E.

	Price Each
9 Taps $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$, $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, $1''^{14}$	
5 Round dies $1\frac{1}{2}''$ in diameter $\frac{1}{4}^{28}$, $\frac{5}{16}^{24}$, $\frac{3}{8}^{24}$, $\frac{7}{16}^{20}$, $\frac{1}{2}^{20}$	
4 Round dies $2\frac{1}{2}''$ in diameter $\frac{5}{8}^{18}$, $\frac{3}{4}^{16}$, $\frac{7}{8}^{14}$, $1''^{14}$	
1 No. 14 die stock with adjustable guide, 14″ long	
1 No. 16 die stock with adjustable guide, $27\frac{1}{2}''$ long	
1 Tap wrench, capacity $\frac{1}{4}''$—$\frac{1}{2}''$	
1 Tap wrench, capacity $\frac{1}{8}''$—1″	**$49.00**
No. 25M with plain solid die stocks	**44.10**

Die stocks furnished with above plates listed on pages 64-65.
Tap wrenches listed on page 45.

Index for High Speed Section

Page
Machinists' Hand Taps 86–87
Nut Taps..88
Tapper Taps.......................................89
Machine Screw Taps..............................90–91
Pipe Taps...92
Beaman & Smith Taps...............................93
Shell Taps..94

High Speed Dies

Spring Screw Threading Dies 95–96–97
Adjustable Round Split Dies..................98–99–100

High-Speed Steel Taps and Dies

We were the first among the tap and die manufacturers to make a commercial success of High-Speed Taps and Dies.

Immediately after the introduction of high-speed steel we started to experiment with some measure of success. Since that time high-speed steel has been much improved, we have gained valuable experience both in working of the steel and in the use of the taps and dies made of it, and we have a firmly established trade among the best classes of tap and die users.

We have conclusively demonstrated that for many kinds of machine work High-Speed Steel Taps and Dies are more economical than the cheaper, ordinary grade.

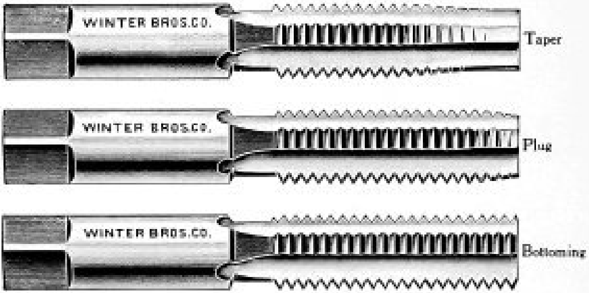
Operating at the same speed as the ordinary grade High-Speed Taps and Dies will be found to give long service, and when the operating speed can be increased the gains resulting from increased production and the long life of the tools much more than compensate for the high first cost.

We have made records of productions increased from five to fifteen times by their use.

High-Speed Steel Machinists' Hand Taps

Sizes of Shanks Furnished Regularly in ¼" and larger

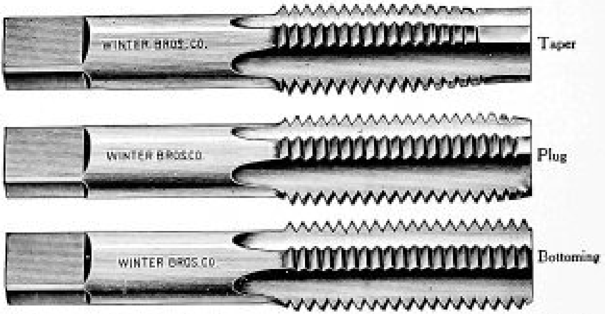
Full Size Shanks



The above style with shanks the full diameter of thread will be furnished in all sizes up to and including ⅜."

Exception — ⅜" will be furnished with shanks the diameter of bottom of thread when orders so specify, at regular prices.

Shanks, the Diameter of Bottom of Thread



This style with shanks the diameter of bottom of thread will be furnished in all sizes, 7⁄16" and larger.

⅜" will also be furnished in this style, when specified, at regular prices.

United States Standard and U. S. Form threads only as per list on opposite page, are furnished at regular prices, all other forms and pitches are special.

Left-Hand Taps are special.

See page 115 for table showing the approximate sizes, in decimals, of shanks and squares.

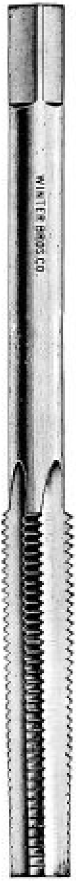
High-Speed Steel Machinists' Hand Taps

Diameter	Standard Number of Threads	U. S. F. Threads also Furnished	Price Each
	U. S. S.		
1/8"	40		$0.50
5/32"	36		.50
3/16"	24	32	.60
7/32"	24		.70
1/4"	20	28	.80
5/16"	18	24	1.00
3/8"	16	24	1.25
7/16"	14	20	1.55
1/2"	13	20	1.90
9/16"	12	18	2.30
5/8"	11	18	2.75
11/16"	11	16	3.25
3/4"	10	16	3.75
13/16"	10		4.30
7/8"	9	14–18	5.00
15/16"	9		5.80
1"	8	14	6.75
1 1/8"	7	12	8.75
1 1/4"	7	12	11.00
1 3/8"	6	12	13.50
1 1/2"	6	12	16.00

Larger taps of all kinds made to order, the larger sizes being made with machinery steel bodies and inserted renewable blades of High-Speed steel; also short shell taps of High-Speed steel which can be fitted to shanks. See pages 92 and 94.

The length over-all, sizes of shanks and squares of these taps are the same as hand taps listed on pages 5–6–7–8.

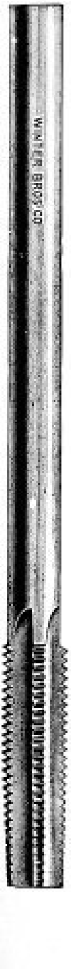
High-Speed Steel Nut Taps



Left-Hand threads are special.

Diameter	Standard Number of Threads	U. S. F. Threads also Furnished	Price Each	Length Over-all Inches
	U. S. S.			
3/16	24	32	**$1.20**	4½
1/4	20	28	**1.40**	5
5/16	18	24	**1.60**	5½
3/8	16	24	**1.90**	6
7/16	14	20	**2.25**	6½
1/2	13	20	**2.70**	7
9/16	12	18	**3.25**	7½
5/8	11	18	**3.85**	8
11/16	11	16	**4.50**	8½
3/4	10	16	**5.20**	9
13/16	10		**6.00**	9½
7/8	9	14, 18	**7.00**	10
15/16	9		**8.25**	10½
1	8	14	**9.75**	11
1 1/8	7	12	**12.50**	11½
1 1/4	7	12	**16.00**	12
1 3/8	6	12	**20.00**	12½
1 1/2	6	12	**25.00**	13

On account of the amount of expensive steel required, and the fact that High-Speed steel shows greater efficiency when taking heavier cuts than those taken by the top of each thread on the long taper of nut and tapper taps, these two styles do not show such great gains in proportion to their cost as other styles.



High-Speed Tapper Taps

Diameter	Number of Threads per Inch		Price Each			
			Lengths			
	U.S.S.	S. A. E.	11″	12″	14″	15″
1/4	20	28				
5/16	18	24				
3/8	16	24				
7/16	14	20				
1/2	13	20				
9/16	12	18				
5/8	11	18				
11/16	11	16				
3/4	10	16	**Prices**	**quoted**	**on appli**	**cation**
13/16	10					
7/8	9	14, 18				
15/16	9					
1	8	14				
1 1/8	7	12				
1 1/4	7	12				
1 3/8	6	12				
1 1/2	6	12				
1 5/8	5½					
1 3/4	5					
1 7/8	5					
2	4½					

See note on the question of efficiency, at bottom of opposite page.

High-Speed Steel Machine Screw Taps

When we started to manufacture High-Speed Taps we did not expect to do much with sizes under ¼″ diameter, thinking that the loss on account of breakage would not give a chance to take advantage of the long-wearing quality of high-speed steel. While this may be true in a few cases, we have learned that many of our best opportunities to show large returns are with Machine Screw Taps.

High-speed steel drill rod, when properly hardened and tempered, averages stronger than carbon steel, so in all cases where there has been but little trouble from breakage, the use of High-Speed Taps should be considered.

In both our carbon steel and our high-speed lines we have adopted, in addition to the recognized standard form, two other styles which have been proved by many trials to be particularly adapted to certain classes of work. The commonly used form is most suitable for hand use, and for most kinds of cast-iron work.

* For Tapping Steel, or other tough metals, use our special form taps designed for this work.

Do not drill small holes and try to tap a full thread. It rarely happens that over 75% of the full thread depth is required, and usually less answers all purposes, and saves much trouble in tapping.

Do not expect the best results in tapping steel unless you use plenty of lard, cotton-seed or sperm oil.

High-Speed Machine Screw Taps not listed are made to order at special prices. We will quote you special discounts, increasing with the quantities ordered.

* See cut and information on page 14.

High-Speed Steel Machine Screw Taps

A. S. M. E. Standard

All sizes and threads not listed are special, and subject to special prices.

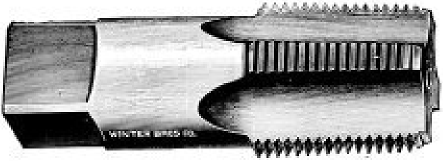
Left-Hand Machine Screw Taps are special.

Read page 14 in regard to different styles for special purposes.

Screw Gauge No.	Price Each	A. S. M. E.	
		Standard	Also Furnished
4	**$0.50**	48	32, 36, 40
5	**.50**	44	36, 40
6	**.50**	40	32, 36
7	**.50**	36	30, 32
8	**.50**	36	30, 32, 40
9	**.60**	32	24, 30
10	**.60**	30	24, 28, 32
12	**.70**	28	24, 32
14	**.80**	24	20

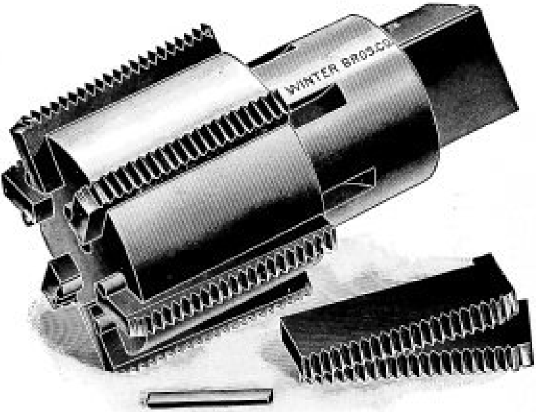
No. 4 to No. 6 inclusive are furnished regularly in three flute style, larger sizes in four flute style.

High-Speed Steel Pipe Taps


WINTER BROS CO.

Size	Price	Size	Price	With Inserted Chasers	
				Size	Price
⅛	$1.20	1	$ 9.00	2	$17.50
¼	1.80	1¼	14.00	2¼	21.50
⅜	2.60	1½	21.00	2½	22.50
½	4.00	2	32.00	2¾-3	26.50
¾	6.00			3¼-3½	32.00
				3¾-4	43.50

Extra chasers per set of 5 for 2" $9.75
Per set of 6 for all larger sizes up to and including 4" $13.50



See note on "Inserted Chaser Taps" on opposite page.

High-Speed Steel Taps for Beaman & Smith Holders

Fitting No. 1 Holder				Fitting No. 2 Holder			
Diameter	Threads		Price each	Diameter	Threads		Price each
	S. A. E.	U. S. S.			S. A. E.	U. S. S.	
1/4	28	20	**$1.50**	5/8	18	11	**$4.20**
5/16	24	18	**1.50**	11/16	16	11	**4.50**
3/8	24	16	**1.60**	3/4	16	10	**4.50**
7/16	20	14	**2.30**	13/16		10	**5.15**
1/2	20	13	**2.40**	7/8	14, 18	9	**6.50**
9/16	18	12	**2.75**	15/16			**7.50**
5/8	18	11	**3.30**	1	14	8	**8.10**
				1 1/8	12	7	**10.50**
				1 1/4	12	7	**13.20**

U. S. S. threads sent unless otherwise specified.

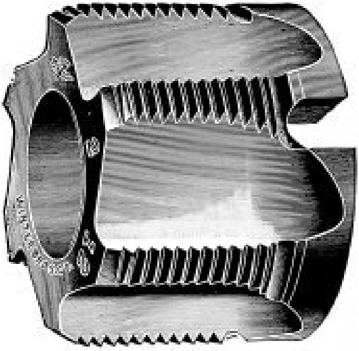
Left-Hand Taps are special.

Inserted Chaser Taps

Taps similar to the inserted chaser pipe tap shown on the opposite page, give the opportunity for great economy and efficiency in all large sizes.

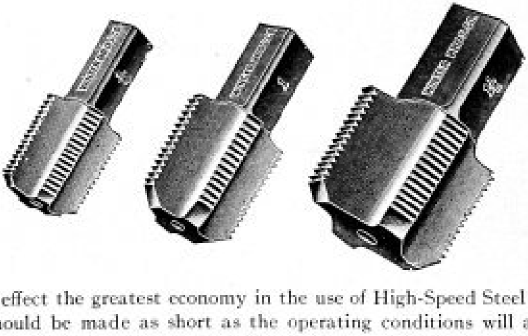
The cost of new sets of High-Speed steel chasers is less than that of a carbon steel tap, of about 2" diameter; and on sizes as large as 4" diameter the cost of a complete inserted chaser tap is less than that of a carbon steel tap, while new sets of chasers of High-Speed steel cost only about one-third as much as a solid carbon steel tap. We make these taps to order to meet all requirements.

High-Speed Steel Shell Taps



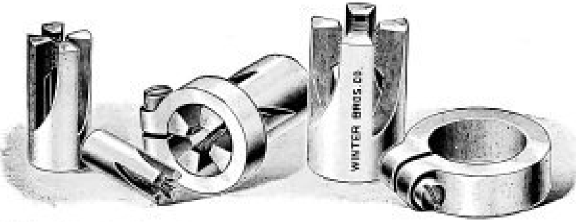
On account of the comparatively small amount of steel required, shell taps are frequently the cheapest style to use for special work. There are many cases, especially in fine thread work, where the length need not be over one inch for taps as large as six inches in diameter. Shell taps are made to order only.

Economical Design of High-Speed Taps



To effect the greatest economy in the use of High-Speed Steel Taps they should be made as short as the operating conditions will allow. Designs that call for shanks of larger diameter than the thread should be avoided, as the price of the tap is determined by the largest diameter.

High-Speed Steel Spring Screw Threading Dies


WINTER BROS. CO.

While dies of this style cost more than others, they offer numerous advantages. They are very easily adjusted. They can be readily ground, when dull. They give ample room for chips and for lubrication. They will average to produce better work in lead, thread form and finish than any other style of dies.

In some cases, where fine threads are used, dies may be made to cut larger sizes than we have listed for each outside diameter, but we advise that it is important to have dies heavy enough so that the sections will not twist under cutting strains.

Clamp collars are not furnished with dies unless ordered.

SIZES AND PRICES

Screw Gauge No.	Outside Diameter Inches	Length Overall Inches	Price Each		No. of Threads Per Inch	
			Die	Clamp Collar	Standard	Threads also Furnished
2	½	1¼	**$2.75**	**$0.50**	64	56
3	½	1¼	**2.75**	**.50**	56	48
4	½	1¼	**2.75**	**.50**	48	32, 36, 40
5	½	1¼	**2.75**	**.50**	44	36, 40
6	½	1¼	**2.75**	**.50**	40	32, 36
8	½	1¼	**2.75**	**.50**	36	30, 32, 40
8	¾	1¾	**3.75**	**.60**	36	30, 32, 40
10	¾	1¾	**3.75**	**.60**	30	24, 28, 32
12	¾	1¾	**3.75**	**.60**	28	24, 32
14	¾	1¾	**3.75**	**.60**	24	20

(Continued on next page)

High-Speed Steel Spring Screw Threading Dies

Fractional Sizes

U. S. Standard Threads sent unless otherwise specified.
Left-Hand Dies are special.

Cutting Size Inches	Outside Diameter Inches	Length Over-all Inches	Price Each		No. of Threads to Inch	
			Die	Clamp Collar	U. S. Standard	S. A. E. Standard
⅛	½	1¼	**$2.75**	**$0.50**	40	—
3/16	½	1¼	**2.75**	**.50**	24	—
¼	¾	1¾	**3.75**	**.60**	20	28
5/16	¾	1¾	**3.75**	**.60**	18	24
⅜	¾	1¾	**3.75**	**.60**	16	24
5/16	1	2	**4.85**	**.70**	18	24
⅜	1	2	**4.85**	**.70**	16	24
7/16	1	2	**4.85**	**.70**	14	20
⅜	1¼	2½	**6.50**	**.80**	16	24
7/16	1¼	2½	**6.50**	**.80**	14	20
½	1¼	2½	**6.50**	**.80**	13	20
9/16	1¼	2½	**6.50**	**.80**	12	18
⅝	1¾	2½	**6.50**	**.80**	11	18

Clamp Collars are sent only when order so specifies.

(Continued on next page)

High-Speed Steel Spring Screw Threading Dies

Fractional Sizes

Cutting Size Inches	Outside Diameter Inches	Length Over-all Inches	Price Each		No. of Threads to Inch	
			Die	Clamp Collar	U. S. Standard	S. A. E. Standard
½	1⅜	2½	**$8.00**	**$1.00**	13	20
9/16	1⅜	2½	**8.00**	**1.00**	12	18
⅝	1⅜	2½	**8.00**	**1.00**	11	18
11/16	1⅜	2½	**8.00**	**1.00**	11	16
¾	1⅜	2½	**8.00**	**1.00**	10	16
⅝	1⅝	2½	**9.75**	**1.00**	11	18
¾	1⅝	2½	**9.75**	**1.00**	10	16
⅞	1⅝	2½	**9.75**	**1.00**	9	14, 18

Clamp Collars are sent only when order so specifies.

(Concluded)

High-Speed Adjustable Round Split Dies

With Adjusting Screw

Without Adjusting Screw

List prices on opposite page apply only to the following standards and pitches:

United States Standard (Standard Pitches Only.)

S. A. E. Standard.

A. S. M. E. Standard up to and including No. 14 (all listed pitches) and outside diameters as per list on page 48.

All other round split dies are special and subject to special prices.

Dies without adjusting screws will be furnished unless otherwise specified.

High-Speed Adjustable Round Split Dies

SIZES AND PRICES

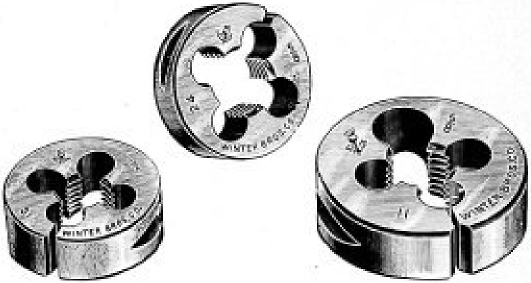
Diameter of Cut. Inches	OUTSIDE DIAMETER—PRICE EACH						
	5/8"	13/16"	1"	1½"	2"	2½"	3"
¼" & under	**$1.00**	**$1.20**	**$1.75**	**$3.50**	**$5.50**	**$9.00**	......
5/16"	**1.20**	**1.20**	**1.75**	**3.50**	**5.50**	**9.00**	......
3/8"	......	**1.40**	**1.75**	**3.50**	**5.50**	**9.00**	......
7/16"	......	......	**1.75**	**3.50**	**5.50**	**9.00**	......
½"	......	......	**2.00**	**3.50**	**5.50**	**9.00**	**$16.00**
5/8"	......	......	......	**3.50**	**5.50**	**9.00**	**16.00**
¾"	......	......	......	**4.00**	**5.50**	**9.00**	**16.00**
7/8"	......	......	......	......	**5.50**	**9.00**	**16.00**
1 "	......	......	......	......	**6.00**	**9.00**	**16.00**
1⅛"	......	......	......	......	**6.50**	**10.00**	**16.00**
1¼"	......	......	......	......	......	**11.00**	**16.00**
1⅜"	......	......	......	......	......	**12.00**	**16.00**
1½"	......	......	......	......	......	......	**16.00**
1⅝"	......	......	......	......	......	......	**17.50**
1¾"	......	......	......	......	......	......	**19.00**

See opposite page for Standards and Threads these prices apply to.

Read page No. 105.

High-Speed Steel Dies

One of the Best Propositions in the Small Tool Line



Thread cutting dies are ideal tools to be made of high-speed steel. A comparatively small amount of steel is used, so the cost is not increased as much over carbon steel as in some other kinds of tools. The heavy cut which they must take on each thread in the tapered part, which is not often over three threads long, is the class of work for which this steel is particularly adapted.

For use in Automatic Machines, the long life of our high-speed dies makes them especially desirable, since stoppages to replace, sharpen, or re-adjust, are much reduced. We have records showing gains in production running from five to fifteen times the amounts that were previously obtained with good carbon steel dies.

All orders will be filled with U. S. S. threads unless otherwise specified.

All Left-Hand Dies are special.

Unless otherwise specified, High-Speed Round Dies will be furnished in the style shown in the above cut, to be adjusted by screws in the die holder; but dies with our regular screw adjustment will be furnished, if so ordered.

Special dies of all kinds made to order.

When special Hobs must be made, a charge will be made for these, and they will be retained in our possession.

Read page 105.

Index to Tables of Information

Page
Dies (information useful in ordering) 105
Decimal equivalents of millimeters 113
Decimal equivalents Machine and Wood Screw Gauge 121
Decimal equivalents numbered and letter size Twist Drills 120
Decimal equivalents numbered Stubs' Steel Wire Gauge 123
Dimensions of Shanks and Squares of Hand Taps in decimals 114–115
Formula for United States Standard Threads 106
Formula for V Form threads 107
Formula for Whitworth Standard Threads 108
Formula for Acme Standard Threads 108
Formula for French and International Standard Threads 109
Formula for A. S. M. E. Standard for Machine Screws 110–111
Form of cutting edges to get maximum results 104
Lead of Taps and Dies 103
Lubrication 104
Size of Taps (Tolerance) 102
Speed of operation of Taps and Dies 104
Tap drill sizes (useful information) 103
Tap drill sizes (Tables):
  A. S. M. E. Standard 116
  V. Form 118
  U. S. Standard 117–118
  Briggs' Standard for pipe 119
Table of constants for determining pitch and root diameters 112
Wire gauge Standards in use in the United States 122
Wrought Iron Welded Tubes, Briggs' Standard, (dimensions) 119

Size of Taps

The best way to make threaded work interchangeable is to use standard size plug thread gauges for testing all tapped holes. The thread gauge should represent the maximum screw size, so it is evident that taps must be a little over standard size, to allow for an easy fit, and a little for wear.

There is quite a difference in opinion as to what constitutes a good fit. Our regular practice on Hand Taps for U. S. S. Screws is as follows:

All sizes up to ⅜" diameter inclusive, have pitch diameters .0005 to .0025 over standard; 7/16" to ⅝" diameter inclusive, .0005 to .003 over standard; ¾" to 1" diameter .0005 to .0035 over standard; 1⅛" to 1½" diameter .0005 to .004 over standard; 1⅝" to 2" diameter .001 to .005 over standard; 2⅛" to 2½" diameter .001 to .0055 over standard; 2⅝" to 3" diameter .001 to .006 over standard.

The tolerance on taps of S. A. E. standard is about .0005 less than the above figures and on all sizes the outside diameter about 50% more over standard size than the pitch diameter. Tapper taps for nuts are generally demanded a little larger than the above. Our V Thread Taps are also made over the standard diameters.

Remember that the outside diameter of a tap has nothing to do with the fit, as long as it is large enough. An increase over standard diameter simply gives clearance above the screw threads, which is desirable, and at the same time allows for the wear of the taps, which is much greater on top of the thread than on the angular sides. Bear these facts in mind when ordering special taps, especially those of decimal dimensions, and those having V threads (see page 107), because if you give the outside diameter only, we are liable to make a poor guess at what you actually need.

The pitch diameter is the vital dimension. All users and makers of threaded work should be supplied with thread calipers. (See page 124.)

Lead

The "lead"—a term which, when applied to tap or screw threads, means the distance advanced in one complete revolution—has much to do with the fit. When the threads are of considerable length the effect of incorrect lead is serious, often causing more trouble than variations in the pitch diameter, while it also happens that it is much more difficult to keep either taps or screws to close limits in lead than in pitch diameter.

In taps, variation in hardening changes is the chief cause of lead troubles. Manufacturers of high-grade taps use great care in making allowances for changes in length, as different brands of steel vary greatly, and different sizes do not change the same amounts. Fine threads do not change the same as coarse threads of the same diameter. Variations in the number and form of the flutes also affect the results.

It requires great care, and very uniform steel, to keep the lead of taps within .003″ variation from standard in one inch long, but commercial screws often vary as much as .010″ in one inch.

With dies the chances for lead troubles are greater than with taps, as we have the hardening of both hobs and dies to contend with, and in use the lead cut by dies is varied by conditions. Holders that do not run true, extreme changes in adjustment, undue pressure advancing or retarding the lead, etc., often cause trouble for which the die manufacturer is not responsible.

Tap Drill Sizes

Except where it is desirable to have all the bearing surface possible for screws that are to be frequently moved, it is poor policy to tap more than 75% of the full thread depth, as the thread of this depth is stronger than the bolt, and the power required to operate taps increases very rapidly as the full thread depth is approached, and the breakage of small taps is greatly increased.

It is often the best practice to use considerably less than 75% of the full thread depth.

For tap drill tables, see pages 116 to 118.

Speed of Operation

It is not often possible for us to give customers definite figures for the speed at which they should operate taps and dies, because there are too many conditions over which we have no control. The material operated on, the machines used, the quantity and quality of the lubrication supplied, all have an important influence on the results. When comparing the speed of taps or dies with other metal cutting tools, bear in mind that they are operated with a positive feed equal to their lead, which is much faster than the feed of most other tools; therefore their speed must usually average lower, unless the work is distributed over a long taper, so that the chip taken by each thread is light. Coarse thread taps or dies not only cut out more stock than fine threads, but, if operated at the same speed, must do the extra work in shorter time, so the diameter alone must not be used as an index for the speed.

Lubrication

Taps and dies should always be well lubricated. This grows more important as the speed increases. There are numerous cheap cutting mixtures and oils on the market that may answer well enough for some classes of work, where cooling is often more important than lubrication; but for taps and dies, especially if threading steel, we recommend cotton-seed, lard or sperm oils only, for good work. Some of our best results under the most severe tests have been with cotton-seed oil, but it is inclined to "gum" up the machines.

Form of Cutting Edges

This is another important item when seeking maximum results. It is evident that we must make our stock work so that it will average well for the materials most commonly used. By far the greatest number of dies are used on steel, so they are regularly made with a "hooking cut." Taps are used in almost every class of material, so we regularly make them with cutting edges nearly radial, but hooking slightly. We can often help our customers very much on this question if we know all the conditions. We carry three styles of machine screw taps in stock. See pages 4 and 14.

Dies

We have gained a very broad experience with thread cutting dies by our direct contact with a large number of the best known producers of automatic screw machine work.

Unless otherwise ordered, all of our carbon steel round dies, larger than ⅜″ outside diameter, are split through one side and adjusted by means of an easily operated screw; but we can furnish solid round dies, or split dies slotted for the points of three set screws, so that they can be adjusted in the die holder.

When work must be threaded close up to a shoulder, specify this fact on your order.

If dies are to be used exclusively on brass, we should be so informed.

We are prepared to furnish relieved dies in sizes larger than ¼″ at a small extra cost. They are sometimes desirable for brass work, and for cutting tapering threads for pipe fittings.

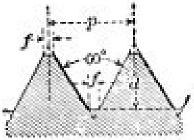
When threads of more than ordinary accuracy in the lead are required, we can supply dies with their lead corrected after hardening.

We list many sizes of round dies in which the cutting size is too large in proportion to the outside diameter. If you wish the best results, keep within the limits marked in the lists on the following pages.

In the case of special dies, when hobs or other tools must be made, their cost will be charged to the first order, and the tools will remain in our possession.

We advise the use of the U. S. Standard threads. It is best to always specify the form of thread on your order.

United States Standard Thread



Formula
$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$
$$D = \text{depth} = P \times .64952$$
$$F = \text{flat} = \frac{P}{8}$$

Unlike the sharp V thread, the U. S. S. form can readily be cut to the figures resulting from the use of the formula.

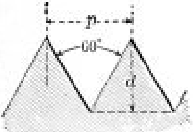
Taps are not generally made exactly standard size, but slightly larger, so that standard plug thread gauges will easily screw into the tapped holes, and also to allow a little for wear. (See page 102).

Standard Pitches

Diameter	1/4	5/16	3/8	7/16	1/2	9/16	5/8
No. Threads	20	18	16	14	13	12	11
Diameter	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
No. Threads	10	9	8	7	7	6	6
Diameter	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8
No. Threads	5 1/2	5	5	4 1/2	4 1/2	4 1/2	4
Diameter	2 1/2	2 5/8	2 3/4	2 7/8	3	3 1/8	3 1/4
No. Threads	4	4	4	3 1/2	3 1/2	3 1/2	3 1/2
Diameter	3 3/8	3 1/2	3 5/8	3 3/4	3 7/8	4	
No. Threads	3 1/4	3 1/4	3 1/4	3	3	3	

While there is no United States Standard for 11/16", 13/16" and 15/16" diameters, you will find these sizes regularly listed with 11, 10 and 9 threads per inch respectively, throughout our catalogue. The U. S. S. thread will always be furnished, unless orders specify otherwise.

V Standard Thread



Formula $\left\{ \begin{array}{l} P = \text{pitch} = \dfrac{1}{\text{No. threads per inch}} \\ D = \text{depth} = P \times .86603 \end{array} \right.$

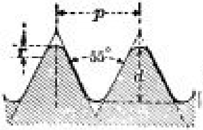
Do not be deceived by the above formula. It is not possible to form, by ordinary means, 60 degree threads of the theoretical depth. If a thread is cut to theoretical pitch diameter the outside diameter will be reduced about .002″ under standard, and will be so sharp as to be impracticable. On this account our standard V thread taps and dies are all made with their angular measurement, or pitch diameter, considerably larger than the theoretical size. All other tap makers follow the same principle, but no two make the same allowance on all sizes. Therefore: THERE IS NO RECOGNIZED STANDARD FOR V THREAD TAPS.

Standard Pitches

Diameter	¼	5/16	⅜	7/16	½	9/16	⅝	11/16
No. Threads	20	18	16	14	12	12	11	11
Diameter	¾	13/16	⅞	15/16	1	1⅛	1¼	1⅜
No. Threads	10	10	9	9	8	7	7	6
Diameter	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2⅜
No. Threads	6	5	5	4½	4½	4½	4½	4½
Diameter	2½	2⅝	2¾	2⅞	3	3⅛	3¼	3⅜
No. Threads	4	4	4	4	3½	3½	3½	3¼
Diameter	3½	3⅝	3¾	3⅞	4			
No. Threads	3¼	3¼	3	3	3			

We recommend the use of the U. S. S. form of thread only, and will furnish it on all orders unless otherwise instructed. We have already eliminated from our lists many V thread sizes formerly furnished, and expect in time to leave them out entirely.

Whitworth Standard Thread



Formula

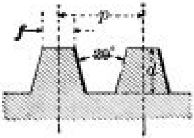
$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

$$D = \text{depth} = P \times .64033$$

$$R = \text{radius} = P \times .1373$$

Diameter	No. Threads per inch	Diameter	No. Threads per inch	Diameter	No. Threads per inch	Diameter	No. Threads per inch
$\frac{1}{4}$	20	$\frac{7}{8}$	9	2	$4\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{1}{4}$
$\frac{5}{16}$	18	$\frac{15}{16}$	9	$2\frac{1}{8}$	$4\frac{1}{2}$	$3\frac{3}{8}$	$3\frac{1}{4}$
$\frac{3}{8}$	16	1	8	$2\frac{1}{4}$	4	$3\frac{1}{2}$	$3\frac{1}{4}$
$\frac{7}{16}$	14	$1\frac{1}{8}$	7	$2\frac{3}{8}$	4	$3\frac{5}{8}$	$3\frac{1}{4}$
$\frac{1}{2}$	12	$1\frac{1}{4}$	7	$2\frac{1}{2}$	4	$3\frac{3}{4}$	3
$\frac{9}{16}$	12	$1\frac{3}{8}$	6	$2\frac{5}{8}$	4	$3\frac{7}{8}$	3
$\frac{5}{8}$	11	$1\frac{1}{2}$	6	$2\frac{3}{4}$	$3\frac{1}{2}$	4	3
$\frac{11}{16}$	11	$1\frac{5}{8}$	5	$2\frac{7}{8}$	$3\frac{1}{2}$		
$\frac{3}{4}$	10	$1\frac{3}{4}$	5	3	$3\frac{1}{2}$		
$\frac{13}{16}$	10	$1\frac{7}{8}$	$4\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{1}{2}$		

Acme Standard Screw Thread



Formula

$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

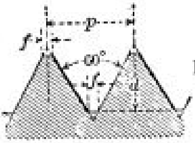
$$D = \text{depth} = \frac{1}{2}P + .010''$$

$$F = \text{flat on top of thread} = P \times .3707$$

It is the general practice to make the outside diameter of taps about .020″ over the standard diameter of the screw, to cut a clearance above the screw threads.

International and French Standard Thread

(Metric System)



Formula

P = pitch

D = depth = P × .6495

$F = \text{flat} = \frac{P}{8}$

International Standard

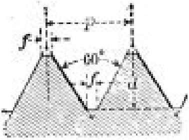
Diameter Millimeters	Pitch Millimeters	Diameter Millimeters	Pitch Millimeters	Diameter Millimeters	Pitch Millimeters
6	1.0	20	2.5	48	5.0
7	1.0	22	2.5	52	5.0
8	1.25	24	3.0	56	5.5
9	1.25	27	3.0	60	5.5
10	1.5	30	3.5	64	6.0
11	1.5	33	3.5	68	6.0
12	1.75	36	4.0	72	6.5
14	2.0	39	4.0	76	6.5
16	2.0	42	4.5	80	7.0
18	2.5	45	4.5		

French Standard

Diameter Millimeters	Pitch Millimeters	Diameter Millimeters	Pitch Millimeters	Diameter Millimeters	Pitch Millimeters
3	0.5	16	2.0	36	4.0
4	0.75	18	2.5	38	4.0
5	0.75	20	2.5	40	4.0
6	1.0	22	2.5	42	4.5
7	1.0	24	3.0	44	4.5
8	1.0	26	3.0	46	4.5
9	1.0	28	3.0	48	5.0
10	1.5	30	3.5	50	5.0
12	1.5	32	3.5		
14	2.0	34	3.5		

American Society of Mechanical Engineers' Standard
A. S. M. E. Standard for Machine Screws

United States Standard Form of Thread



Formula

$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

$$D = \text{depth} = P \times .64952$$

$$F = \text{flat} = \frac{P}{8}$$

Standard Screws

Note.—Maximum sizes given are the standard sizes.

Basic Size		Outside Diameter		Pitch Diameter		Root Diameter	
No.	Out. Diam. and Threads per In.	Min.	Max.	Min.	Max.	Min.	Max.
0	.060–80	.0572	.0600	.0505	.0519	.0410	.0438
1	.073–72	.0700	.0730	.0625	.0640	.0520	.0550
2	.086–64	.0828	.0860	.0742	.0759	.0624	.0657
3	.099–56	.0955	.0990	.0857	.0874	.0721	.0758
4	.112–48	.1082	.1120	.0966	.0985	.0808	.0849
5	.125–44	.1210	.1250	.1082	.1102	.0910	.0955
6	.138–40	.1338	.1380	.1197	.1218	.1007	.1055
7	.151–36	.1466	.1510	.1308	.1330	.1097	.1149
8	.164–36	.1596	.1640	.1438	.1460	.1227	.1279
9	.177–32	.1723	.1770	.1544	.1567	.1307	.1364
10	.190–30	.1852	.1900	.1660	.1684	.1407	.1467
12	.216–28	.2111	.2160	.1903	.1928	.1633	.1696
14	.242–24	.2368	.2420	.2123	.2149	.1807	.1879
16	.268–22	.2626	.2680	.2358	.2385	.2013	.2090
18	.294–20	.2884	.2940	.2587	.2615	.2208	.2290
20	.320–20	.3144	.3200	.2847	.2875	.2468	.2550
22	.346–18	.3402	.3460	.3070	.3099	.2649	.2738
24	.372–16	.3660	.3720	.3284	.3314	.2810	.2908
26	.398–16	.3920	.3980	.3544	.3574	.3070	.3168
28	.424–14	.4178	.4240	.3745	.3776	.3204	.3312
30	.450–14	.4438	.4500	.4005	.4036	.3464	.3572

(Continued on next page.)

A. S. M. E. Standard

(Concluded)

Special Screws

Note.—Maximum sizes given are the standard sizes.

No.	Basic Size	Outside Diameters		Pitch Diameters		Root Diameters	
	Out. Diam. and Threads per In.	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	.073–64	.0698	.0730	.0612	.0629	.0494	.0527
2	.086–56	.0825	.0860	.0727	.0744	.0591	.0628
3	.099–48	.0952	.0990	.0836	.0855	.0678	.0719
4	.112–40	.1078	.1120	.0937	.0958	.0747	.0795
	.112–36	.1076	.1120	.0918	.0940	.0707	.0759
5	.125–40	.1208	.1250	.1067	.1088	.0877	.0925
	.125–36	.1206	.1250	.1048	.1070	.0837	.0889
6	.138–36	.1336	.1380	.1178	.1200	.0967	.1019
	.138–32	.1333	.1380	.1154	.1177	.0917	.0974
7	.151–32	.1463	.1510	.1284	.1307	.1047	.1104
	.151–30	.1462	.1510	.1269	.1294	.1017	.1077
8	.164–32	.1593	.1640	.1414	.1437	.1177	.1234
	.164–30	.1592	.1640	.1399	.1423	.1147	.1207
9	.177–30	.1722	.1770	.1529	.1553	.1277	.1337
	.177–24	.1718	.1770	.1473	.1499	.1158	.1229
10	.190–32	.1853	.1900	.1674	.1697	.1437	.1494
	.190–24	.1848	.1900	.1603	.1629	.1287	.1359
12	.216–24	.2108	.2160	.1863	.1889	.1547	.1619
14	.242–20	.2364	.2420	.2067	.2095	.1688	.1770
16	.268–20	.2624	.2680	.2327	.2355	.1948	.2030
18	.294–18	.2882	.2940	.2550	.2579	.2129	.2218
20	.320–18	.3142	.3200	.2810	.2839	.2389	.2478
22	.346–16	.3400	.3460	.3024	.3054	.2550	.2648
24	.372–18	.3662	.3720	.3330	.3359	.2909	.2998
26	.398–14	.3918	.3980	.3485	.3516	.2944	.3052
28	.424–16	.4180	.4240	.3804	.3834	.3330	.3428
30	.450–16	.4440	.4500	.4064	.4094	.3590	.3688

The above standard for Machine Screws was adopted by the American Society of Mechanical Engineers at the Indianapolis meeting, May 28-31, 1907.

For full and complete details concerning this standard and the Engineers' recommendations, see their report, Volume 28, No. 9.

Constants for Finding Pitch Diameter and Root Diameter of Screw Threads

To find the pitch diameter or root diameter of any screw thread, subtract the constant for the number of threads per inch from the outside diameter.

Threads per Inch	Constants for Finding Pitch Diameter			Constants for Finding Root Diameter		
	U. S. S. Thread	Whit. Thread	Theoretical V *	U. S. S. Thread	Whit. Thread	Theoretical V *
72	.0090	.0089	.0120	.01804	.01786	.02406
64	.0101	.0100	.0135	.02030	.02001	.02706
60	.0108	.0107	.0144	.02165	.02134	.02887
56	.0116	.0114	.0155	.02320	.02286	.03093
50	.0130	.0128	.0173	.02598	.02562	.03464
48	.0135	.0133	.0180	.02706	.02668	.03608
44	.0148	.0146	.0197	.02952	.02910	.03936
40	.0162	.0160	.0217	.03248	.03202	.04330
36	.0180	.0178	.0241	.03608	.03558	.04811
32	.0203	.0200	.0271	.04059	.04002	.05413
30	.0217	.0213	.0289	.04330	.04268	.05773
28	.0232	.0229	.0309	.04639	.04574	.06186
27	.0241	.0237	.0321	.04812	.04742	.06416
26	.0250	.0246	.0333	.04996	.04926	.06662
24	.0271	.0267	.0361	.05413	.05336	.07217
22	.0295	.0291	.0394	.05905	.05821	.07873
20	.0325	.0320	.0433	.06495	.06403	.08660
18	.0361	.0355	.0481	.07217	.07114	.09623
16	.0406	.0400	.0541	.08119	.08004	.10825
14	.0464	.0457	.0619	.09279	.09147	.12372
13	.0499	.0493	.0666	.09993	.09851	.13323
12	.0541	.0533	.0722	.10825	.10672	.14434
11½	.0565	.0557	.0753	.11296	.11132	.15062
11	.0590	.0582	.0787	.11809	.11642	.15746
10	.0649	.0640	.0866	.12990	.12806	.17321
9	.0721	.0711	.0962	.14434	.14230	.19245
8	.0812	.0800	.1082	.16238	.16008	.21651
7	.0928	.0914	.1237	.18558	.18295	.24744
6	.1082	.1066	.1443	.21651	.21344	.28868
5½	.1180	.1164	.1575	.23619	.23284	.31492
5	.1299	.1280	.1732	.25981	.25613	.34641
4½	.1443	.1422	.1924	.28868	.28458	.38490
4	.1624	.1601	.2165	.32476	.32017	.43301
3½	.1855	.1830	.2474	.37115	.36590	.49487
3¼	.1998	.1970	.2665	.39970	.39404	.53294
3	.2165	.2134	.2887	.43301	.42689	.57733

*The figures for V thread are theoretical figures only and cannot be worked to in actual practice.

Decimal Equivalents of Millimeters and Fractions of Millimeters

$\frac{1}{100}$ mm. = .0003937″

mm.	Inches
$\frac{1}{50}$	.00079
$\frac{2}{50}$	.00157
$\frac{3}{50}$	.00236
$\frac{4}{50}$	.00315
$\frac{5}{50}$	.00394
$\frac{6}{50}$	.00472
$\frac{7}{50}$	.00551
$\frac{8}{50}$	.00630
$\frac{9}{50}$	.00709
$\frac{10}{50}$	.00787
$\frac{11}{50}$	.00866
$\frac{12}{50}$	.00945
$\frac{13}{50}$	.01024
$\frac{14}{50}$	.01102
$\frac{15}{50}$	.01181
$\frac{16}{50}$	.01260
$\frac{17}{50}$	.01339
$\frac{18}{50}$	.01417
$\frac{19}{50}$	.01496
$\frac{20}{50}$	.01575
$\frac{21}{50}$	.01654
$\frac{22}{50}$	.01732
$\frac{23}{50}$	.01811
$\frac{24}{50}$	.01890
$\frac{25}{50}$	.01969
$\frac{26}{50}$	.02047
$\frac{27}{50}$	.02126
$\frac{28}{50}$	.02205
$\frac{29}{50}$	.02283
$\frac{30}{50}$	.02362
$\frac{31}{50}$	.02441
$\frac{32}{50}$	.02520
$\frac{33}{50}$	.02598
$\frac{34}{50}$	.02677
$\frac{35}{50}$	.02756
$\frac{36}{50}$	.02835
$\frac{37}{50}$	.02913
$\frac{38}{50}$	.02992
$\frac{39}{50}$	.03071
$\frac{40}{50}$	.03150
$\frac{41}{50}$	.03228
$\frac{42}{50}$	.03307
$\frac{43}{50}$	.03386
$\frac{44}{50}$	.03465
$\frac{45}{50}$	.03543
$\frac{46}{50}$	.03622
$\frac{47}{50}$	.03701
$\frac{48}{50}$	.03780
$\frac{49}{50}$	.03858
1	.03937
2	.07874
3	.11811
4	.15748
5	.19685
6	.23622
7	.27559
8	.31496
9	.35433
10	.39370
11	.43307
12	.47244
13	.51181
14	.55118
15	.59055
16	.62992
17	.66929
18	.70866
19	.74803
20	.78740
21	.82677
22	.86614
23	.90551
24	.94488
25	.98425
26	1.02362
27	1.06299
28	1.10236
29	1.14173
30	1.18110
31	1.22047
32	1.25984
33	1.29921
34	1.33858
35	1.37795
36	1.41732
37	1.45669
38	1.49606
39	1.53543
40	1.57480
41	1.61417
42	1.65354
43	1.69291
44	1.73228
45	1.77165
46	1.81102
47	1.85039
48	1.88976
49	1.92913
50	1.96850
51	2.00787
52	2.04724
53	2.08661
54	2.12598
55	2.16535
56	2.20472
57	2.24409
58	2.28346
59	2.32283
60	2.36220
61	2.40157
62	2.44094
63	2.48031
64	2.51968
65	2.55905
66	2.59842
67	2.63779
68	2.67716
69	2.71653
70	2.75590
71	2.79527
72	2.83464
73	2.87401
74	2.91338
75	2.95275
76	2.99212
77	3.03149
78	3.07086
79	3.11023
80	3.14960
81	3.18897
82	3.22834
83	3.26771
84	3.30708
85	3.34645
86	3.38582
87	3.42519
88	3.46456
89	3.50393
90	3.54330
91	3.58267
92	3.62204
93	3.66141
94	3.70078
95	3.74015
96	3.77952
97	3.81889
98	3.85826
99	3.89763
100	3.93700

10mm. = 1 Centimeter = 0.3937 inches
10cm. = 1 Decimeter = 3.937 inches
10. dm. = 1 Meter = 39.37 inches
25.4mm. = 1 English inch

Tolerances for Hand Taps

Length over-all, $\frac{1}{4}$" to $1\frac{1}{32}$" incl.	plus or minus $\frac{1}{32}$"
Length over-all, $1\frac{1}{16}$" to 4" incl.	plus or minus $\frac{1}{16}$"
Length of thread	plus or minus $\frac{5}{64}$"
Diameter of shank to 1" incl.	size to size minus .005"
Diameter of shank $1\frac{1}{32}$" to 2" incl.	size to size minus .007"
Diameter of shank over 2"	size to size minus .009"
Size of square, $\frac{1}{2}$" and smaller	size to size minus .004"
Size of square, $\frac{33}{64}$" to 1" incl.	size to size minus .006"
Size of square, $1\frac{1}{32}$" to 2" incl.	size to size minus .008"
Size of square, $2\frac{1}{32}$" to 4" incl.	size to size minus .010"

See page No. 115.

For tolerance on Pitch and outside diameter of all forms of taps, a separate pamphlet will be mailed on request.

Dimensions of Shanks and Squares on Standard Hand Taps

Diam. of Tap Inches	Length, Inches		Diam. of Shank Inches	Size of Square Inches	Diam. of Tap Inches	Length, Inches		Diam. of Shank Inches	Size of Square Inches
	Thread	Over-all				Thread	Over-all		
1/4	1	2 1/2	.2530	.1897	1 1/4	2 9/16	5 3/4	1.0215	.7661
17/64	1	2 1/2	.2686	.2015	1 9/32	2 9/16	5 3/4	1.0527	.7895
9/32	1	2 1/2	.2843	.2132	1 5/16	2 9/16	5 3/4	1.0840	.8130
19/64	1	2 1/2	.2999	.2249	1 3/8	3	6 1/16	1.1083	.8312
5/16	1 1/8	2 23/32	.3155	.2366	1 13/32	3	6 1/16	1.1395	.8546
21/64	1 1/8	2 23/32	.3311	.2483	1 7/16	3	6 1/16	1.1708	.8781
11/32	1 1/8	2 23/32	.3468	.2601	1 1/2	3	6 3/8	1.2333	.9250
23/64	1 1/8	2 23/32	.3624	.2718	1 17/32	3	6 3/8	1.2645	.9484
3/8	1 1/4	2 15/16	.3785	.2839	1 5/8	3 3/16	6 11/16	1.3050	.9787
25/64	1 1/4	2 15/16	.3941	.2956	1 21/32	3 3/16	6 11/16	1.3362	1.0021
13/32	1 1/4	2 15/16	.4098	.3074	1 3/4	3 3/16	7	1.4300	1.0725
					1 25/32	3 3/16	7	1.4612	1.0959
3/8	1 1/4	2 15/16	.2750	.2062	1 7/8	3 3/16	7 5/16	1.5195	1.1396
25/64	1 1/4	2 15/16	.2906	.2179	1 29/32	3 3/16	7 5/16	1.5507	1.1630
13/32	1 1/4	2 15/16	.3062	.2296	2	3 3/16	7 5/8	1.6445	1.2334
27/64	1 1/4	2 15/16	.3218	.2414	2 1/32	3 3/16	7 5/8	1.6757	1.2568
7/16	1 7/16	3 5/32	.3232	.2424	2 1/8	3 3/16	8	1.7694	1.3271
29/64	1 7/16	3 5/32	.3388	.2541	2 5/32	3 3/16	8	1.8007	1.3505
15/32	1 7/16	3 5/32	.3544	.2658	2 1/4	3 3/16	8 1/4	1.8944	1.4208
31/64	1 7/16	3 5/32	.3700	.2775	2 9/32	3 3/16	8 1/4	1.9257	1.4443
1/2	1 21/32	3 3/8	.3667	.2750	2 3/8	4	8 1/2	2.0194	1.5146
33/64	1 21/32	3 3/8	.3823	.2867	2 13/32	4	8 1/2	2.0507	1.5380
17/32	1 21/32	3 3/8	.3979	.2984	2 1/2	4	8 3/4	2.1000	1.5750
35/64	1 21/32	3 3/8	.4135	.3101	2 17/32	4	8 3/4	2.1313	1.5984
9/16	1 21/32	3 19/32	.4292	.3219	2 5/8	4	8 3/4	2.2250	1.6687
37/64	1 21/32	3 19/32	.4448	.3336	2 21/32	4	8 3/4	2.2563	1.6922
19/32	1 21/32	3 19/32	.4604	.3453	2 3/4	4	9 1/4	2.3500	1.7625
39/64	1 21/32	3 19/32	.4760	.3570	2 25/32	4	9 1/4	2.3813	1.7859
5/8	1 13/16	3 13/16	.4796	.3597	2 7/8	4	9 1/4	2.4750	1.8562
41/64	1 13/16	3 13/16	.4952	.3714	2 29/32	4	9 1/4	2.5063	1.8797
21/32	1 13/16	3 13/16	.5108	.3831	3	4 7/16	9 3/4	2.5429	1.9072
11/16	1 13/16	4 1/32	.5421	.4066	3 1/32	4 7/16	9 3/4	2.5742	1.9306
23/32	1 13/16	4 1/32	.5733	.4300	3 1/8	4 7/16	9 3/4	2.6679	2.0009
3/4	2	4 1/4	.5900	.4425	3 5/32	4 7/16	9 3/4	2.6992	2.0244
25/32	2	4 1/4	.6212	.4659	3 1/4	4 7/16	10	2.7929	2.0946
13/16	2	4 15/32	.6525	.4894	3 9/32	4 7/16	10	2.8242	2.1181
27/32	2	4 15/32	.6837	.5128	3 3/8	4 7/16	10	2.8827	2.1620
7/8	2 7/32	4 11/16	.6973	.5230	3 13/32	4 7/16	10	2.9140	2.1855
29/32	2 7/32	4 11/16	.7285	.5464	3 1/2	4 11/16	10 1/4	3.0077	2.2557
15/16	2 7/32	4 29/32	.7598	.5698	3 17/32	4 11/16	10 1/4	3.0390	2.2792
31/32	2 7/32	4 29/32	.7910	.5932	3 5/8	4 11/16	10 1/4	3.1327	2.3495
1	2 1/2	5 1/8	.8000	.6000	3 21/32	4 11/16	10 1/4	3.1640	2.3730
1 1/32	2 1/2	5 1/8	.8312	.6234	3 3/4	5 1/16	10 1/2	3.2167	2.4125
1 1/16	2 1/2	5 1/8	.8625	.6469	3 25/32	5 1/16	10 1/2	3.2479	2.4359
1 1/8	2 9/16	5 7/16	.8965	.6724	3 7/8	5 1/16	10 1/2	3.3417	2.5062
1 5/32	2 9/16	5 7/16	.9277	.6958	3 29/32	5 1/16	10 1/2	3.3729	2.5297
1 3/16	2 9/16	5 7/16	.9590	.7192	4	5 1/16	10 3/4	3.4667	2.6000

For tolerances applying to above table, see page No. 114.

Tap Drills

For A. S. M. E. Standard Machine Screw Taps

The sizes given will cut considerably larger than the root of the thread, and are larger than published in some similar lists, but for practical operation, especially for machine tapping, will be found none too large.

Size of Tap	No. of Threads	Size of Drill
0	80	55
1	56	53
1	64	53
1	72	52
2	56	49
2	64	48
3	48	45
3	56	44
4	32	44
4	36	43
4	40	42
4	48	41
5	36	39
5	40	38
5	44	37
6	32	34
6	36	33
6	40	32
7	30	31
7	32	$\frac{1}{8}$
7	36	30
8	30	29
8	32	29
8	36	28
9	24	27
9	30	26
9	32	25
10	24	23
10	28	21
10	30	20
10	32	20
12	24	16
12	28	14
12	32	12
14	20	9
14	24	6
16	18	2
16	20	2
16	22	1
18	18	C
18	20	D
20	16	G
20	18	H
20	20	I

See table of constants for pitch and root diameters, page **112**.

Tap Drills

For U. S. Form Threads

Size of Tap	Threads per Inch	Size of Drill
1/16	64, 72	56, 56
5/64	60, 72	53, 52
3/32	48, 50	50, 50
7/64	48	44
1/8	32, 40	43, 41
9/64	40	34
5/32	32, 36	31, 1/8
11/64	32	29
3/16	24, 32	28, 24
13/64	24	23
7/32	24, 32	18, 14
15/64	24	13
1/4	20, 24, 27, 28, 32	9, 7, 5, 4, 3
5/16	18, 20, 24, 27, 32	1/4, F, 17/64, I, J
3/8	16, 20, 24, 27	5/16, O, 21/64, Q
7/16	14, 20, 24, 27	23/64, V, X, 25/64
1/2	12, 13, 20, 24, 27	13/32, 27/64, 7/16, 29/64, 29/64
9/16	12, 18, 27	15/32, 1/2, 33/64
5/8	11, 12, 18, 27	17/32, 17/32, 9/16 37/64
11/16	11, 16	37/64, 39/64
3/4	10, 12, 16, 27	41/64, 21/32, 43/64, 45/64
13/16	10	43/64
7/8	9, 12, 14, 18, 27	3/4, 25/32, 51/64, 13/16, 53/64

See table of constants for pitch and root diameters, page 112.

Tap Drills

For U. S. Form Threads

(Continued)

Size of Tap	Threads per Inch	Size of Drill
15/16	9–12	13/16–27/32
1″	8–12–14–27	55/64–29/32–59/64–61/64
1⅛	7–12	63/64–1 1/32
1¼	7–12	1 5/64–1 5/32
1⅜	6–12	1 11/64–1 9/32
1½	6–12	1 19/64–1 13/32
1⅝	5½	1 13/32
1¾	5	1 33/64
1⅞	5	1 41/64
2″	4½	1 47/64
2⅛	4½	1 55/64
2¼	4½	1 63/64
2⅜	4	2 3/32
2½	4	2 7/32

For V Form Threads

Size of Tap	Size of Drill	Size of Tap	Size of Drill	Size of Tap	Size of Drill
¼–18	12	½–14	13/32	15/16–9	51/64
¼–20	9	9/16–12	29/64	1 –8	55/64
¼–24	5	⅝–10	½	1⅛–7	15/16
5/16–18	¼	⅝–11	33/64	1¼–7	1 1/16
5/16–20	F	⅝–12	33/64	1⅜–6	1 5/64
⅜–14	L	11/16–11	37/64	1½–6	1 11/64
⅜–16	N	¾–10	⅝	1⅝–5	1 11/32
⅜–18	5/16	¾–12	41/64	1¾–5	1 15/32
7/16–14	S	13/16–10	11/16	1⅞–4½	1 9/16
½–12	X	⅞–9	47/64	2 –4½	1 11/16
½–13	Y				

These sizes do not leave a full thread when holes are tapped, but are as near it as is desirable for practical manufacturing.

See table of constants for pitch and root diameters, page 112.

Standard Dimensions of Wrought-Iron Welded Tubes

Briggs' Standard

Diameter of Tubes			Thickness of Metal Inches	Screwed Ends	
Nominal Inside Inches	Actual Inside Inches	Actual Outside Inches		Number of Threads to Inch	Length of Perfect Thread Inches
1/8	0.270	0.405	0.068	27	0.19
1/4	0.364	0.540	0.088	18	0.29
3/8	0.494	0.675	0.091	18	0.30
1/2	0.623	0.840	0.109	14	0.39
3/4	0.824	1.050	0.113	14	0.40
1	1.048	1.315	0.134	11 1/2	0.51
1 1/4	1.380	1.660	0.140	11 1/2	0.54
1 1/2	1.610	1.900	0.145	11 1/2	0.55
2	2.067	2.375	0.154	11 1/2	0.58
2 1/2	2.468	2.875	0.204	8	0.89
3	3.067	3.500	0.217	8	0.95
3 1/2	3.548	4.000	0.226	8	1.00
4	4.026	4.500	0.237	8	1.05
4 1/2	4.508	5.000	0.246	8	1.10
5	5.045	5.563	0.259	8	1.16
6	6.065	6.625	0.280	8	1.26
7	7.023	7.625	0.301	8	1.36
8	7.982	8.625	0.322	8	1.46
*9	9.000	9.688	0.344	8	1.57
10	10.019	10.750	0.366	8	1.68

Tap Drills for Pipe Taps

The sizes of drills to be used in boring holes to be reamed with pipe reamer, and threaded with pipe taps, are as follows:

Size of Tap	Threads Per Inch	Size of Drill	Size of Tap	Threads Per Inch	Size of Drill
1/8	27	21/64	1 1/2	11 1/2	1 47/64
1/4	18	7/16	2	11 1/2	2 13/64
3/8	18	9/16	2 1/2	8	2 5/8
1/2	14	45/64	3	8	3 1/4
3/4	14	29/32	3 1/2	8	3 47/64
1"	11 1/2	1 9/64	4	8	4 15/64
1 1/4	11 1/2	1 33/64			

Decimal Equivalents

of the

Numbers of Twist Drill and Steel Wire Gauge

No.	Size of No. in Decimals	No.	Size of No. in Decimals	No.	Size of No. in Decimals	No.	Size of No. in Decimals
1	.2280	21	.1590	41	.0960	61	.0390
2	.2210	22	.1570	42	.0935	62	.0380
3	.2130	23	.1540	43	.0890	63	.0370
4	.2090	24	.1520	44	.0860	64	.0360
5	.2055	25	.1495	45	.0820	65	.0350
6	.2040	26	.1470	46	.0810	66	.0330
7	.2010	27	.1440	47	.0785	67	.0320
8	.1990	28	.1405	48	.0760	68	.0310
9	.1960	29	.1360	49	.0730	69	.02925
10	.1935	30	.1285	50	.0700	70	.0280
11	.1910	31	.1200	51	.0670	71	.0260
12	.1890	32	.1160	52	.0635	72	.0250
13	.1850	33	.1130	53	.0595	73	.0240
14	.1820	34	.1110	54	.0550	74	.0225
15	.1800	35	.1100	55	.0520	75	.0210
16	.1770	36	.1065	56	.0465	76	.0200
17	.1730	37	.1040	57	.0430	77	.0180
18	.1695	38	.1015	58	.0420	78	.0160
19	.1660	39	.0995	59	.0410	79	.0145
20	.1610	40	.0980	60	.0400	80	.0135

Letter Sizes

A	.234	H	.266	O	.316	U	.368
B	.238	I	.272	P	.323	V	.377
C	.242	J	.277	Q	.331	W	.386
D	.246	K	.281	R	.339	X	.397
E	.25	L	.29	S	.348	Y	.404
F	.257	M	.295	T	.358	Z	.413
G	.261	N	.302				

Machine and Wood Screw Gauge

Number of Screw Gauge	Size of Number in Decimals	Number of Screw Gauge	Size of Number in Decimals
000	.03152	25	.38684
00	.04468	26	.40000
0	.05784	27	.41316
1	.07100	28	.42632
2	.08416	29	.43948
3	.09732	30	.45264
4	.11048	31	.46580
5	.12364	32	.47896
6	.13680	33	.49212
7	.14996	34	.50528
8	.16312	35	.51844
9	.17628	36	.53160
10	.18944	37	.54476
11	.20260	38	.55792
12	.21576	39	.57108
13	.22892	40	.58424
14	.24208	41	.59740
15	.25524	42	.61056
16	.26840	43	.62372
17	.28156	44	.63688
18	.29472	45	.65004
19	.30788	46	.66320
20	.32104	47	.67636
21	.33420	48	.68952
22	.34736	49	.70268
23	.36052	50	.71584
24	.37368		

The difference between consecutive sizes is .01316 inch.

Different Standards for Wire Gauge in Use in the United States

Dimensions of Sizes in Decimal Parts of an Inch

No. of Wire Gauge	American or Brown & Sharpe	Birmingham or Stubs' Wire	Washburn & Moen Mfg. Co. Worcester Mass.	Trenton Iron Co. Trenton, N. J.	Stubs' Steel Wire	U. S. Standard for Plate	No. of Wire Gauge
000000	—	—	—	—	—	.46875	000000
00000	—	—	—	.45	—	.4375	00000
0000	.46	.454	.3938	.4	—	.40625	0000
000	.40964	.425	.3625	.36	—	.375	000
00	.3648	.38	.3310	.33	—	.34375	00
0	.32486	.34	.3065	.305	—	.3125	0
1	.2893	.3	.2830	.285	.227	.28125	1
2	.25763	.284	.2625	.265	.219	.265625	2
3	.22942	.259	.2437	.245	.212	.25	3
4	.20431	.238	.2253	.225	.207	.234375	4
5	.18194	.22	.2070	.205	.204	.21875	5
6	.16202	.203	.1920	.19	.201	.203125	6
7	.14428	.18	.1770	.175	.199	.1875	7
8	.12849	.165	.1620	.16	.197	.171875	8
9	.11443	.148	.1483	.145	.194	.15625	9
10	.10189	.134	.1350	.13	.191	.140625	10
11	.090742	.12	.1205	.1175	.188	.125	11
12	.080808	.109	.1055	.105	.185	.109375	12
13	.071961	.095	.0915	.0925	.182	.09375	13
14	.064084	.083	.0800	.08	.180	.078125	14
15	.057068	.072	.0720	.07	.178	.0703125	15
16	.05082	.065	.0625	.061	.175	.0625	16
17	.045257	.058	.0540	.0525	.172	.05625	17
18	.040303	.049	.0475	.045	.168	.05	18
19	.03589	.042	.0410	.04	.164	.04375	19
20	.031961	.035	.0348	.035	.161	.0375	20
21	.028462	.032	.03175	.031	.157	.034375	21
22	.025347	.028	.0286	.028	.155	.03125	22
23	.022571	.025	.0258	.025	.153	.028125	23
24	.0201	.022	.0230	.0225	.151	.025	24
25	.0179	.02	.0204	.02	.148	.021875	25
26	.01594	.018	.0181	.018	.146	.01875	26
27	.014195	.016	.0173	.017	.143	.0171875	27
28	.012641	.014	.0162	.016	.139	.015625	28
29	.011257	.013	.0150	.015	.134	0140625	29
30	.010025	.012	.0140	.014	.127	0125	30
31	.008928	.01	.0132	.013	.120	.0109375	31
32	.00795	.009	.0128	.012	.115	.01015625	32
33	.00708	.008	.0118	.011	.112	.009375	33
34	.006304	.007	.0104	.01	.110	.00859375	34
35	.005614	.005	.0095	.0095	.108	.0078125	35
36	.005	.004	.0090	.009	.106	.00703125	36
37	.004453	—	—	.0085	.103	.006640625	37
38	.003965	—	—	.008	.101	.00625	38
39	.003531	—	—	.0075	.099	——	39
40	.003144	—	—	.007	.097	——	40

See note on next page.

Table of Decimal Equivalents of Stubs' Steel Wire Guage

Letter	Size of Letter in Decimals	No. of Wire Gauge	Size of Number in Decimals	No. of Wire Gauge	Size of Number in Decimals	No. of Wire Gauge	Size of Number in Decimals
Z	.413	1	.227	28	.139	55	.050
Y	.404	2	.219	29	.134	56	.045
X	.397	3	.212	30	.127	57	.042
W	.386	4	.207	31	.120	58	.041
V	.377	5	.204	32	.115	59	.040
U	.368	6	.201	33	.112	60	.039
T	.358	7	.199	34	.110	61	.038
S	.348	8	.197	35	.108	62	.037
R	.339	9	.194	36	.106	63	.036
Q	.332	10	.191	37	.103	64	.035
P	.323	11	.188	38	.101	65	.033
O	.316	12	.185	39	.099	66	.032
N	.302	13	.182	40	.097	67	.031
M	.295	14	.180	41	.095	68	.030
L	.290	15	.178	42	.092	69	.029
K	.281	16	.175	43	.088	70	.027
J	.277	17	.172	44	.085	71	.026
I	.272	18	.168	45	.081	72	.024
H	.266	19	.164	46	.079	73	.023
G	.261	20	.161	47	.077	74	.022
F	.257	21	.157	48	.075	75	.020
E	.250	22	.155	49	.072	76	.018
D	.246	23	.153	50	.069	77	.016
C	.242	24	.151	51	.066	78	.015
B	.238	25	.148	52	.063	79	.014
A	.234	26	.146	53	.058	80	.013
		27	.143	54	.055		

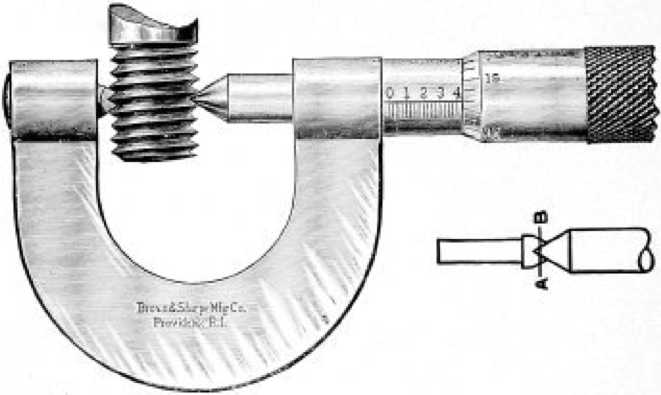
Stubs' Gauges

In using the Gauges known as Stubs' Gauges, there should be constantly borne in mind the difference between the Stubs' Iron Wire Gauge and the Stubs' Steel Wire Gauge.

The Stubs' Iron Wire Gauge is the one commonly known as the English Standard Wire, or Birmingham Gauge, and designates the Stubs' *soft* wire sizes.

The Stubs' Steel Wire Gauge is the one that is used in measuring drawn steel wire or drill rods of Stubs' make, and is also used by many makers of American drill rods.

Micrometer Calipers, for Measuring Screw Threads



The distinctive feature in the construction of this Caliper is that the end of the movable spindle is pointed and the fixed end or "anvil" is V-shaped. Enough is taken from the end of the point and the bottom of the V is carried down low enough, so that they will not rest on the bottom or top of the thread to be measured, but on the cut surface. As the thread itself is measured, it will be seen that the actual outside diameter of the piece does not enter into consideration.

As we measure one-half of the depth of the thread from the top, on each side, the diameter of the thread as indicated by the Caliper, or the pitch diameter, is the full size of the thread less the depth of one thread.

When the point and anvil are in contact the 0 represents a line drawn through the plane A B, and if the Caliper is opened, say to .500, it represents the distance of the two planes .500″ apart.

We recommend the use of this micrometer in measuring screws and taps.

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